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THE  
**PRINCIPLES OF HEALTH,**  
[ELEMENTS OF HYGIENE;]  
OR,  
**A TREATISE**  
ON THE  
INFLUENCE OF PHYSICAL AND MORAL CAUSES  
ON MAN,  
AND ON THE MEANS OF PRESERVING HEALTH.

BY ETIENNE TOURTELLE,

Professor of the Special School of Medicine of Strassburg; Member of several National and Foreign Academies; and an Associate of the Institution of Health and Salubrity for the Prefecture of the Guard sitting at Nîmes.

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Valetudo sustentatur notitiâ sui corporis, et observatione quæ res aut prodesse soleant, aut obesse, et continentia in victu omni atque cultu corporis tuendi causa, et prætermittendis voluptatibus, &c. CICERO, DE OFFIC.

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FROM THE SECOND FRENCH EDITION, CORRECTED AND AUGMENTED.

TRANSLATED

BY G. WILLIAMSON, L. M. C. F. M.

Member of the Medical and Chirurgical Faculty of Maryland, and Honorary member of the Medical Society of Baltimore, &c. &c.

WITH NOTES AND APPENDICES BY THE TRANSLATOR.

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*DISTRICT OF MARYLAND, ss.*

BE IT REMEMBERED, That on this twenty-first day of June, in the forty-  
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\*\*\* SEAL. \*\*\* George Williamson of the said District hath deposited in this office,  
\*\*\*\*\* the Title of a Book, the right whereof he claims as Proprietor, in  
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“The Principles of Health, [Elements of Hygiene;] or, a treatise on the influence of physical and moral causes on man, and on the means of preserving health. By Etienne Tourtelle, professor of the Special School of Medicine of Strasburg; member of several National and Foreign Academies; and an associate of the Institution of Health and Salubrity for the Prefecture of the Guard sitting at Nimes.

“Valetudo sustentatur notitiâ sui corporis, et observatione quæ res aut prodesse soleant, aut obesse, et continentia in victu omni atque cultu corporis tuendi causâ, et prætermittendis voluptatibus, &c.—Cicero, De Offic.

“From the second French edition, corrected and augmented.

“Translated by G. Williamson, L. M. C. F. M. member of the Medical and Chirurgical Faculty of Maryland, and honorary member of the Medical Society of Baltimore, &c. &c. with notes and appendices by the Translator.”

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PHILIP MOORE,  
*Clerk of the District of Maryland.*

# PRINCIPLES OF HEALTH.

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## CHAPTER III.

### *On Vegetable Aliments.*

THIS class of aliments comprehends, 1. Fruits; 2. Pot herbs; 3. Grains or gramina; 4. Non-gramina, farinaceous vegetables; 5. Lastly, nuts.

#### ARTICLE I.

##### *Of Fruits.*

Botanists give the name of fruit to a substance reproductive of a tree or plant: Thus the acorn is the fruit of the oak, the pear that of the pear tree, &c. The name of fruit is equally extended to every species of grain, whether naked or enclosed in any envelopment whatever. In hygiene we only consider the fruit used by man as nourishment.

We may, in general, divide fruits in relation to their taste: 1. Into acid fruits; 2. Sweet fruits; 3. Lastly, into astringent or acerb fruits.

SECT. 1. *Of acid fruits.* Fruits, especially those of summer, called by the Latins, *fructus horæi*, are in general cooling; they appease thirst, and excite by virtue of a slight stimulus, the secretion of the saliva and of the gastric juices; they also possess, but in a less eminent degree, an antiputrescent virtue; hence, they are very salutary in inflammatory or bilious disease. Fruits, also possess in a high degree, a sedative quality, for they very obviously diminish the action of the sanguiferous system; they produce this effect as soon as they are received into the stomach. It appears, that it is to their sedative quality, that they owe the property of diminishing animal heat. It is very probable, that by reducing the action of the vascular system, they prevent the arterial blood from passing rapidly into venous blood; it thence results, that the blood does not promptly acquire the carbonated hydrogen gas, and less carbonic is disengaged. In addition, as they act sympathetically throughout the system, they diminish the frequency of respiration, and by consequence, less caloric passes into the pulmonary blood. This is the only manner of rationally accounting for their refrigerant action. Some have wished to explain this effect, by comparing these substances to salts, which produce cold during their solution in water; but this explanation is not satisfactory; for the cold occasioned by salts, only continues during their solution, whereas, fruits produce this effect upon the system for a considerable time. Besides acids which with water, produce a

very sensible degree of cold, are powerful refrigerants, when drank in a certain quantity with water.\*

The virtues of which I have just spoken, render the use of fruits very salutary in diseases, in which the vascular action is much augmented, as well as in nervous affections, which depend upon an excess of energy and tone. Van Swieten cites the case of a maniac, who was entirely cured by eating a great quantity of cherries. We find in the writings of physicians, many cures of this kind, performed by the use of fruit. However an excess of fruit may be prejudicial to health, especially when green: It produces indigestion, diarrhea, and many other analogous affections. Experience proves that it may also occasion a relapse of an intermittent fever and dysentery. Its debilitating quality singularly promotes the morbid action of marsh miasma, which is the cause of these diseases, and eminently disposes the system to contract them.

Acids decompose the bile, and cause it to pass off by the intestines. Summer fruits produce this effect in consequence of the acid that they contain, and their moderate use prevents the disorders, which a superabundance and acrimony of this fluid occasions. Fruits likewise, contain a certain quantity of sugar, which renders them nourishing. They ferment in the stomach and disengage much air. They are diuretics in consequence of the acid and water they contain. Their use is indicated in summer, even by nature, and their being regarded by some physicians of the

\* This subject is explained at some length in my essay on the sedative effects of cold. See Medical Museum.—*Tr.*

last century as pernicious, producing certain diseases, which they on the contrary either prevent or cure, was contrary to reason and fact. The author of nature has caused fruit to grow in abundance in warm countries or warm seasons, being absolutely useful to man: Hence it happens that a kind of instinct excites the human species to seek them, in preference to other aliments in these countries and in these seasons, as well as in cases where the humoral system tends strongly to become bilious.\* It is proper, however, not to abuse their use, as I have already said, especially in a convalescence from intermittent fevers, and from dysenteries, and in winters where these diseases are endemic.

Fruit that is not sufficiently ripe, is unhealthy and should not be used. Its compact tissue renders it less soluble, which causes it to remain too long in the stomach, and it contracts an acid fermentation, which if not corrected, generally produces disorder throughout the system. Ripe fruit, even when used to excess produce disease, by contracting the acid fermentation in the *primæ viæ*; and especially those that contain much acid.

In the class of acid fruits, we may include barberries, sour cherries, citrons, apples and currants.

1. Barberries, (*berberis*, *berberis vulgaris*, *Lin.*) The barberry is a prickly shrub, which grows throughout Europe and in America. The stamina of its flowers, exhibit signs of irritability when touched. Its berries ripen in autumn; they contain the citric acid, and have an exquisite taste when subjected to the influence of frost. In Egypt, where this shrub grows

\* Van Swieten.



in great abundances, much use is made of its fruit, especially in acute and pestilential fevers. Prosper Alpini relates, that he was himself, attacked with a pestilential fever, and with a considerable diarrhea, and was cured by this fruit. Simon Pauli experienced a like good effect from its use, in a similar disease, With this fruit we make syrup, jelly, and preserves; which afford a drink and nourishment not less agreeable than useful, in all cases where a cooling diet is necessary.

2. Sour cherries, (*cerasa acida; prunus cerasus* Lin.; *cerasus sativa, fructu rotundo, rubro et acido, Tourn.*) The cherry is a stone fruit, of a tree whose trunk is of a middle size. The cherries under consideration, are very sour and cooling. They contain about the same quantity of citric as of malic acid. The meat of the cherry is succulent, and it is as healthy as it is pleasant to the taste, and especially when it is cooked or sweetened with sugar.

3. Citrons, (*citreum malum; citrus medica, Lin.*) The citron is a seed fruit of a small tree, which is an evergreen, and was at first brought from Assyria and Media in Greece, and thence into the southern parts of Europe. Hence its fruit is called in Latin, *mala medica, mala Assyria*. In the days of Pliny, the fruit of the citron was not eaten; it was first used in the time of Galen and Apicius. It contains a great quantity of citric acid, and possesses the same virtues as the preceding fruit.

4. Apples, (*poma, mala; pyrus malus, Lin.*) The apple is the fruit of a tree which is peculiar to temperate countries. Apples are rare in the middle of Italy and the south of France, owing to the heat of the cli-

mate. There are many species and varieties of the apple. The most esteemed (in France) are the pip-pins, rambour, *culville rouge*, the rennet of England, the *fenouillet*, and the violet apple of *Api*. Apples are very nourishing; they contain a considerable quantity of the malic and carbonic acid. The latter renders this fruit very flatulent. Wild apples are very sour, and are rarely used except for cider, the quality of which is superior to that obtained from the fruit of the domesticated tree. Cider is the ordinary drink in the province formerly called Normandy, and in many provinces of England. The immoderate use of apples is not without danger: It sometimes occasions serious diseases, and especially, dangerous cholics and rheumatic affections. The vegetable cholic is often the effect of it. The Devonshire cholic which prevailed as an epidemic in 1724, and which has been described by Huxham, was owing to the excessive use of cider, and of apples which were very abundant that year.\* It was no doubt, from similar accidents that Horace was induced to say, that years in which apples were abundant were bad: *pomifero grave tempus anno*.†

5. Currants, (*ribesia*) are the fruit of a shrub, of which two species are cultivated in the gardens: The first is an original of the woods (*ribes rubrum*, *Lin.*) it has two varieties, the one red, the other white fruit, both growing in clusters. The second is the *cassis*, or black currant it is less sour than the others, and

\* This disease has generally been attributed to the leaden vessels used in making the cider. The excessive use of cider however pure, will no doubt produce disease; and there are constitutions to whom it is pernicious in any quantity.—*Tr.*

† *Od.* 23, lib. iii.



has an unpleasant smell, (*ribes nigrum*, *Lin.*) this is an original of damp woods. Black currants are diuretic; a *ratafia* is made of them with a handful of the leaves of the shrub; this *ratafia* is supposed to be a stomachic, and to be good in cases of indigestion; we think it doubtful whether it possesses these virtues. The red currants are the most cooling; they contain nearly as much citric as malic acid; they have more aroma than the white, and loose it when they become perfectly ripe. The white and red currants are eaten without any preparation, but are improved by sugar. Children and especially young girls, who are affected with the chlorosis, pregnant women, and persons with fever, are very fond of them in consequence of their acid, vinous, and agreeable taste; when preserved with sugar, they furnish a light and cooling aliment, which is peculiarly proper in a convalescent state from acute diseases. From this fruit and sugar a syrup is made that is very similar to that of lemons, and the agreeable taste of which has been a means of introducing it from the pharmacy to the confectionary. Wine may be made from each species of the currant.

SECT. 2. *Of sweet fruits.* Sweet fruits contain more sugar than they do acid; they are not only very agreeable to the taste, but also very nourishing, and of an easy digestion, for they are very soluble in the gastric juice. This class includes the pine-apple, apricot, orange, sweet cherry, melons, water-melons, cucumber, gourd, date, fig, strawberry, raspberry, pomegranate, juniper, sweet apples, mulberry, blackberry, peaches, grapes, and gooseberries.

1. Pine-apples, (*bromelia ananas*, *Lin.*) the fruit of a plant or tree originally from South America.

This tree is also found in the island of Madagascar; it is cultivated in the European gardens, but its culture requires much care. The fruit has an exquisite taste, which surpasses that of all the known fruits. The pine-apple is very easily digested; it is very nourishing, and a diuretic; by expression a juice is obtained from it, with which an excellent liquor is made, that is almost equal to malmsey, and which is inebriating. This fruit when preserved, has the property of rekindling the flames of love; it is also eaten raw in slices in wine and in brandy.

2. Apricots, (*mala, armeniaca; prunes armeniaca, Lin.*) a stone fruit of a tree, originally from Armenia, which has been naturalized in the warm and temperate countries of Europe. There are several species of the apricot; among others, there are two which differ, the kernel of the one being sweet, the other bitter. The early flower of the apricot tree, requires to be guarded by a layer of straw, to prevent its being injured by the cold weather that occurs late in the spring, and which destroys them when they are not protected. The fruit of the apricot tree which grows in the open air, has a taste and perfume superior to that of an espalier, owing no doubt, from its deriving more advantage from the influence of the atmosphere. Apricots are very easy to digest, and are very nourishing, but they soon pass off. Cullen considered them the most healthy of the stone fruits. Galen preferred them to peaches; they are an ornament to the table, whether raw, preserved in sugar, or prepared in marmalade, stewed, &c. The kernels either in a whole or broken state, enter into the *ratafia* of kernels. Oil may be extracted from the kernels; an orgeat is also

made of it. A gum exudes from the apricot tree, that might supersede the gum Arabic; the extravasation of this gum, is a disease which destroys the branches of the apricot tree.

3. Sweet oranges (*aurantia; citrus aurantium, Lin.*) is a fruit with seed, of a small tree, originally from China, but naturalized in the south of France. The orange tree is a most beautiful one, owing to the whiteness and sweet odors of its flowers, (it is much sought for by the bees, (the beautiful green of its leaves, of which it is never deprived, its golden colored fruit, and the agreeable sight of the buds of the opening flower, and of the fruit, all of which are displayed at the same time. Sweet oranges possess in an eminent degree, the sedative and cooling quality; their use is very salutary in warm countries and in hot seasons, to prevent inflammatory fevers and putrid bilious diseases. From the flowers of the orange there is distilled a volatile and very agreeable aromatic oil, which is employed in perfumes and in seasonings; its bark also furnishes a volatile oil, which sugar renders miscible in water; the fruit is eaten either raw or preserved. The best oranges are those of a red meat.

4. Sweet cherries, (*cerasa dulcia.*) There are a great many species and varieties of this fruit, the principal of which are the common, the heart, (*cerasus carne dura,*) the black cherry, (*cerasus sativa fructu majori,*) the hard cherry tree, (*cerussus fructu aqueo,*) and that of the small cherry tree of the woods, (*cerassus fructu negro.*) All these species differ in respect to size, color, consistency, and taste; they contain much sugar, are very nourishing, and easy to digest.

The cherry tree grows naturally in the woods of the environs of the Black sea, and of the town of Cheraconda, or Chirisanda; it was not Lucullus who introduced the first of these trees into Europe, for Diphilus Siphnius, contemporary with Lysimachus, spoke of cherries. Van Swieten relates several cures of maniacs performed by the use of cherries alone, taken to the quantity of more than twenty pounds per day. Fernal saw several cases of melancholy cured by the decoction of dried cherries.

5. Water melons, (*citrulli*, *anguriæ*, *cucurbita citrullus*, *Lin.*) an annual *curcurbita* plant original of Jamaica. Some amateurs cultivate this plant in Europe. Its fruit is of an enormous size; water melons are seen in Egypt more than three feet long and two thick; they are very nourishing and cooling, and constitute the principal nourishment of the people in that country during a part of summer; they are highly diuretic; but as they are cold and very fermentable, they should only be used with prudence. They are preserved in sugar; in this state, less is to be feared from their use.

6. Melons, (*melones*, *cucumis melo*, *Lin.*) the fruit of an annual spreading *curcurbita* plant, with male and female flowers, separated upon the same foot stalk, and an original of Africa. There are many varieties of the melon; the best are the cantelope, remarkable, especially by the large seed; those of a middle size with redish meat, are particularly esteemed. Melons have an aromatic odor, they contain a certain quantity of the principle of sugar, in consequence of which they are nourishing; but they easily run into a state of fermentation, and cause in weak stomachs the effects



that result from acidity, such as cholic, flatulency, diarrhea, and sometimes dysentery; they should be used in moderation, especially when the stomach does not digest them easily. The injurious effects of the melon may be prevented, and the digestion of it aided, by seasoning it with sugar, or salt and pepper, and by drinking a little good wine immediately after eating it. Melons, according to the experiments of Sanctorious, singularly diminish the transpiration; but ordinarily augment the *quantity* of urine, not only owing to the *great quantity* of water they contain, but also owing to their possessing the property of exciting the specific sense of the urinary organs, and consequently of augmenting their action; they also possess a laxative virtue in a higher degree, than most of the other fruits, and this virtue is common to all the fruits of the class of *curcurbita*. Small green melons are pickled in vinegar; when ripe, they are eaten raw. The seed of the melon serves to make emulsions with; the ancients included them in the number of the four larger cold seeds. A highly anodyne oil is also extracted from them by expression. Horses are very fond of the rind of melons.

7. Dates, (*dactyli*) a stone fruit which contains a good quantity of the matter of sugar, and which are very nourishing; their nutritive quality is proved by the use of several nations, who make them their only nourishment; whole families in Egypt, Syria, Persia, and Turkey, live upon dates; they are slightly astringent; this is the reason Hippocrates recommends them in diarrhea.

8. Figs, (*ficus; ficus carica, Lin.*) they are the fruit of the fig tree, a small shrub originally from

Asia, much cultivated in the south of France, in the south and west of Europe, and which does not support the rigors of cold; the principal species of them are white, long, round, angelica, and violet.

It has been supposed that the fig tree does not bear any flowers, but botanists have at length discovered them; they are concealed in the fruit itself. The stamina, which are supported by small styles and the pistillum, have been observed in the interior, around the calx of them near the pediculus; these are succeeded by small hard seeds. Figs are in general very sweet and nourishing; they contain much sugar and mucous. The Athletia made use of them, according to the relation of Pliny, and the cultivators of the Archipelago still make them their principal nourishment. Hippocrates recommends them in consequence of their sweet and slightly laxative quality, in constipations of the bowels, and in affections of the breast and kidneys. Figs are eaten fresh or dried. Brandy is extracted from them by fermentation. Jujupes and sebestins differ but little from figs, as respects their alimentary qualities, except that these fruits are less nourishing, and not so agreeable to the taste.

9. Strawberries (*fraga; fragaria vesca, Lin.*) are a red or white fruit of the strawberry vine, which is a low plant of the woods, and is cultivated in gardens; they are of a sweet and slightly acidulous taste; the seed of them are at the surface. Strawberries contain the citric and malic acids in about an equal proportion; they are tender, very soluble and nourishing. It is said that the inhabitants of the Appenine dry them for use in winter; they are in general cooling and diuretic. Schnlze asserts, that many persons affected

with a cough, have been cured by their use. Hoffman cites a case of the phthisic cured by the use of this fruit. It has been observed that cases of mania and melancholy have been entirely cured by strawberries, taken as the only nourishment for many weeks, to the quantity of twenty pounds per day. The celebrated Linnæus says, that he preserved himself from the return of the gout, by eating large quantities of strawberries every year; but it is to be supposed that his cure should be attributed to another cause, for many persons subject to this disease, have, unsuccessfully, tried to prevent its return by this means. Strawberries are generally eaten with sugar and water, with wine, milk, or cream; their excessive use should be avoided, especially when the stomach is weak, for they easily contract *acidity* in this viscus. It is also remarked that the urine frequently contracts the smell of strawberries. Those that are cultivated in gardens have a more exquisite taste, than those that grow in the woods; nevertheless the latter have a stronger perfume and are more salutary. By letting their juice ferment, it furnishes a wine from which alcohol may be obtained; if the fermentation continues too long, it turns sour and spoils. It is advisable to wash strawberries previous to using them, because toads and serpents, which love the odor of them, frequently repair under the strawberry vine, and throw their slaver upon the fruit. With the juice of strawberries, the juice of lemons and water, mixed in an equal quantity with a little sugar, is prepared a very agreeable drink, called *greek beverage*. It is said, the distilled water of strawberries, is an excellent cosmetic, that effaces the redness and freckles of the

face: we must be permitted to doubt the truth of this assertion, however, it is an innocent means which the women may try without danger, for if it does not produce the desired effect, it will at least do no injury.

10. Raspberry, (*rubus idæus*, *Lin.*) a fruit of the raspberry bush, which has a considerable perfume, and a very agreeable taste. It possesses in a few respects, nearly the same qualities that the strawberry does, and gives by distillation an aromatic water, the flavor of which is delicious. In Russia and Polish Lavonia, they make, from the raspberry, an exquisite mead, that resembles the Portugal wine. Raspberries are eaten raw, mixed with strawberries and currants; they are preserved, made into jellies, syrups, &c.; and vinegar is made from them: they enter into the composition of several *ratafias*. With raspberries, sugar, and water, is prepared a very cooling drink, that is a diuretic, and which has a very agreeable taste. Infused in wine or vinegar, they communicate to these, a very nice smell and taste. They cannot be kept many days when ripe, without being preserved, because they soon mould, and in this state vermin are engendered in them, which spoil them. By fermenting them they furnish wine, from which alcohol may be obtained.

11. Pomegranates, (*mala punica*; *punica granatus*, *Lin.*) The fruit of the pomegranate tree, a shrub that grows spontaneously in Asia, Africa, and in the south and west of Europe: the pomegranate has a cold and vinous taste; there are among them, those that are acid. Pomegranates contain a great number of seed, pretty similar to those of the grape, in which is a kernel,



that is bitter and slightly astringent. The pulp of the pomegranate is nourishing, it possesses the general properties of the other fruits, and offers nothing in particular.

12. Mulberries, (*mori*) the fruit of an indigenous tree of the south of Europe; which has been very well naturalised in France. The leaves of this tree serve to nourish the silk worm. There are two principal varieties of the mulberry, the white (*morus alba*, *Lin.*) and the black, (*morus nigra*, *Lin.*) from the bark of the mulberry tree, which is filamentous, may be obtained as well as from hemp, a substance from which linen and rope may be made. Paper may also be made with it. The mulberry is a very sweet fruit, and one which contains much of the principle of sugar: it is by no means astringent, as some physicians have thought, but on the contrary laxative.

13. Blackberry. Blackberries are the fruit of the briar of hedges, (*rubus fruticosus*, *Lin.*) They are sweet, and have not much aroma. They are cooling, appease thirst, and are by no means unhealthy, as some persons have supposed.

14. Sweet apples, (*mala dulcia*.) Sweet apples possess the same qualities that the other fruits of this class do. However, as their tissue is hard, they dissolve slowly in the gastric juice, and frequently generate acidity in weak stomachs. In cases of dyspepsia, apples are sometimes thrown off by vomiting, two and even three hours after they have been eaten, without having undergone any sensible alteration. When the stomach is weak, sweet as well as sour apples should be cooked and seasoned.

15. Peaches, (*persica mala*; *amygdalus persica*,

*Lin.*) A stone fruit of a tree which it is supposed, is an original of Asia and America. There are many varieties of peaches. It is without foundation, that some persons, who regard as infallible the authority of the ancients, have attributed to them injurious and unhealthy qualities; when eaten ripe and in small quantities, they furnish an innocent, savory, delicate, cooling, and healthy nourishment. They are preserved in brandy, vinegar, or sugar. And wine is made from them.\*

16. Gooseberries, (*uvæ crispæ, grossularia; ribes uva crisper, Lin.*) Gooseberries are sweet and contain a great quantity of sugar: they are very soluble and nourishing, but easily ferment in the stomach. The English make wine with ripe gooseberries, by putting them in a cask, and pouring boiling water on them. The cask is well stopped, and put in a temperate place, where it remains during twenty or thirty days, until the water becomes impregnated with the alcohol of the fruit. The liquor is afterwards put in bottles, with sugar: the bottles then remain undisturbed, until fermentation has changed the liquor into wine. When the gooseberries are green, they are used for seasoning instead of verjuice.

17. Grapes, (*uvæ vites*) a fruit in bunches or clusters, of the vine; (*vitis vinifera, Lin.*) which is a shrub originally of Asia, where it has been cultivated from time immemorial, for the use of wine must be as old as the world, since in the most remote ages, and among almost all nations, a principal part

\* In this country, and especially in some parts of Maryland and Virginia, where peaches grow to great perfection; the inhabitants make a great quantity of a spirituous liquor, called peach brandy from them.--*T*h.

of the worship consisted in offering to the Supreme Being bread and wine. The vine grows naturally, in the woods of Louisiana and Canada, and there multiplies of itself.

There are a great many species and varieties of the grape, which differ in form, size, color, taste, and precocity; some of which are preferable for the table, and others for wine. The vine is cultivated in the warm and temperate countries of Europe, and it grows in every place where the summer is not too short, nor the rains frequent, as between the thirtieth and fifty-first degree of north latitude: beyond these terms the culture of it is unfruitful.

The vine is cultivated in the greatest part of France; and perhaps the vineyards drew the Franks into Gaul, as they had attracted the Gauls into Italy.

But there prevails at present, in many of the districts where the vine is cultivated, an abuse not less prejudicial to the public good, than to private interest; it is the abundant culture of the vine in low flat grounds. In addition to the wine which is obtained from the grapes cultivated in these situations, being of an inferior quality, the labor that vines thus situated require, becomes injurious to the cultivation. I have frequently seen with displeasure, vines occupying ground, the horizontal plain of which, rendered it proper to receive the plough: I think we could do without wine, but not without bread.

It is very certain that flat lands are not the most proper for the cultivation of the vine. By confining the vine to the soil which is by nature destined for it, we promote the population, because we secure bread

to a greater number of persons, than we do by cultivating it in those places calculated to receive the plough. Hills, especially those that are steep, are the most proper places for the vine: they have the advantage of producing the best fruit, and of facilitating the culture of it. Vines cannot be trimmed but with tools, such as the mattock or pickaxe, &c.; each of these forces the cultivator of the vine to maintain a very confined position; he is obliged to keep much bent in level ground, and this attitude, extremely fatiguing, united to the heat of the day, renders him incapable of constant labor. From these efforts against nature, innumerable accidents flow. It is rare to see in a country where the vines are planted in low ground, an old vine dresser, or rather a young laborer, whom the labor has not rendered old; whose body is not bent forward, the breast sunk inward, and who is not in fact deformed and afflicted by this attitude.

These inconveniences do not occur among the workmen, who cultivate vines planted upon hills. The vine dresser in ascending from the foot towards the top of the hill, is only obliged to be half as much bent, as when the vines are planted in level ground, to reach them placed in such a soil as this, which is, by its natural position, almost as high as his arms. Hence he only cultivates the vine where wheat cannot grow, and he harvests in every place where a furrow can be ploughed. The vine is better, and the gayety that the wine produces, is not empoisoned by the idea of misfortunes and premature deaths, that are owing to the cultivation of the vine. But do I care, says the rich, for the agonies and mutilations of the poor vine dressers, provided I drink the nectar out of cups of



gold! for such is frequently the effect of riches; they harden the heart and render it inaccessible to the mild sentiments of humanity.

Grapes possess in a high degree, all the qualities of the sweet fruits; they contain much sugar: this is the reason they are very nourishing. They also contain the tartarous and citric acids, in different proportions, according to the degree of ripeness and the species of grape. It is the great quantity of sugar and the tartarous acid contained in the grapes, which gives to the wine obtained from this delicious fruit, the superiority that it possesses over other wines.

Fresh grapes ferment easily, and it is prudent not to eat many of them, when the person has a weak stomach: besides their skin digests with difficulty, and there have been persons, who, according to the testimony of Galen, Kerckring, and many others, have retained whole seeds of grapes in their stomach for more than three months.

The seeds are astringent, and the new wine is very fermentable: it is dangerous to drink it, in consequence of the fermentation that it contracts in the primæ viæ, and which sometimes occasions the greatest disturbances in the system. *Mustum inflat et subducit acconturbat fervens in ventre, et alvo secedit.* Hipp. lib. ii. de diæta.

Grapes are eaten fresh, dry or preserved. As the grapes of Corinth (*passulæ minores*) are the most agreeable to the taste, and the most easy to preserve, we are principally in the habit of drying them; their seed are smaller than those of the red currant. We are also in the habit of drying the grapes of Damas, the seed of which resembles in their size, small prunes;

these are very nourishing, and those of Corinth the most laxative.

18. Prunes, (*pruna; prunus domestica, Lin.*) a stone fruit of a middle size tree, original of the south of Europe, of which there exists many varieties, that differ in their form, color, taste, size, and period of maturity. The principal are, 1. The *black Damas prune, or the large violet damson of Tours*; its pulp is laxative; this species is prepared and dried in large quantities in the province formerly called Touraine: 2. The *prune de monsieur*, which is very fine and large, and of a violet yellow; it is very good, especially in warm countries, and in the southern departments of France: 3. The *prune of Saint Catherine*, which is large, white, good to eat, and makes a liquor: 4. The *grey damson or apricot prune*, that is large, round, white, or of a slight red, which makes it resemble a small apricot; it possesses an exquisite taste: 5. The *prune of Brugnoles*, which is small, of a clear red; its flesh is not very firm, it is slightly acid and vinous, it is watery and cooling: 6. The *reine clau**de*, the skin of which is thin and green, the meat succulent and very sweet; it is the best of all the prunes: 7. Lastly, the *mirabelle*, which is particularly esteemed in preserves.

Prunes in general are very analagous to apricots, in relation to their effects upon the animal economy; those that are the most watery, ferment easily in the stomach; those that are sweet and have been dried, are very laxative. In general, of all the ripe fruits, prunes possess in the highest degree the laxative quality. Drying deprives fruit of a great part of its water, and of the air that was contained in it; it con-

concentrates the matter of sugar, and thus renders it sweeter and more nourishing. Prunes are very fermentable; when fermented, a strong liquor is obtained from them similar to cherry water, and which is called *zwetschgen-wasser*.

All acid or sweet fruits possess in a greater or less degree, a laxative virtue, and in consequence of this property, they diminish the transpiration.

SECT. 3. *Of astringent or acerb fruits.* All the fruits which have the property of approximating and contracting the cellular tissue, of condensing and augmenting the cohesive force, are called astringent. All the astringent vegetable substances have a rough and acerb taste; the greater part of them contain the gallic acid, the presence of which is easily known by its precipitating iron black, which it affects in a solution of this metal in the other acids. The principal fruits that have a rough taste, are wild plums, cornalberry, quince, medlar, cramberry, olives, pears, and the service.

1. Wild plums (*prunioli; prunus insitiva, Lin.*) are the fruit of a thorny shrub, called wild plum tree. When green, wild plums are astringent; when ripe, they are slightly laxative; they are not much esteemed, and are of a disagreeable taste. In Germany they prepare from the wild plums a kind of wine and small beer, which they recommend in fluxes of the belly, and in profuse menstruation; they dry the green wild plums, and afterwards ferment them with must or beer; they also express the juice of the green plums, and render it thick by boiling, until it is of the consistence of a solid extract; they call this preparation *German acacia*, and substitute it for the true *acacia*,

though it is more acid and more astringent. The juice of this fruit expressed when ripe, is a purgative; the druggists use it to adulterate tamarinds.

2. Cornal berry, (*cornu; cornus mas, Lin.*) is a seed fruit, of a small tree, originally of the woods, which grows in the temperate parts of Europe; there are several species of it, and it is cultivated. Cornal berries have a rough and astringent taste; they were formerly used in medicines, and they are rarely eaten raw; they are preserved as the barberry, and in vinegar as the olive; they are also mixed with other fruits to make fermented liquors; they are used to improve cider and perry. The kernel of the stone affords an oil.

3. Quinces (*cydonia; prinus cydonia, Lin.*) are the fruit of a middle size tree, which has been brought from Creta in Italy, and which is now cultivated throughout Europe; their meat is very odoriferous and slightly acid; they are astringent. Quinces are rarely eaten raw; when cooked they are more friendly to the stomach. From the pulp a jelly is made, which is called *cognac* or rob of quince. Wine, liquors and a syrup, presumed to be good to correct the pituitous humor is, also made from the quince. Its seeds are mucilagenous, and proper for emulsions.

4. Medlar, (*mespili; mespilus germanica, Lin.*) the fruit of a middle size tree, which grows in the temperate parts of Europe; it has a rough taste, which is by age converted into a mild and vinous one. The fruit of the acerb is so astringent, that Wedel relates having seen it occasion a constipation followed by epilepsy.

5. Cramberry or myrtle grape of the woods, (*mu-*



*tilli; vaccinium myrtillus. Lin.*) is the fruit of a small shrub, which grows throughout Europe; it is rough and astringent combined with a certain sweetness, which induces the shepherds and mountaineers to be fond of it. A juice comes from the fruit which is astringent, and which may be substituted for the *acacia*. The adulterers of wine use myrtle berries to give a red color to white wine.

6. Olives, (*olea; olea europæa, Lin.*) a stone fruit of a small tree, which is a native of the south of Europe and the east of Asia. This fruit is gathered unripe about October; it is washed in lye to deprive it of its bitter principle; it is afterwards seasoned, and thus sent in casks over all Europe. Olives are astringent, they contain a certain quantity of oil that is sweet and agreeable, which is obtained by expression, and is much used. Olives are difficult to digest, and persons of a weak and delicate constitution should not eat them. The olive branch has for a long time been the emblem of concord, friendship, and peace, as that of the laurel is the emblem of glory.

7. Pear, (*pyri; pyrus communis, Lin.*) a seed fruit of a large tree of the forest. There are at least one hundred and fifty varieties of this fruit, differing in their size, color, and taste; they have all originated from the wild pear tree. The wild tree produces an extremely rough fruit, of which the inhabitants of the Pyranese make a cider of a bad quality. Culture has rendered the pear pleasant and generally very sweet; yet there are some species of it which retain the roughness of the wild pear, and which occasions, when eaten, a sensation of strangling. The pear tree is deprived of its thorns by culture; but if their number

is much increased as in a hedge, they regain their thorns, and the fruit of these is rough like the species of the woods. The cultivated pears possess nearly the same qualities as sweet apples; they are more watery, sweeter, and consequently contract more easily the acid fermentation in the *primæ viæ*; they are also more laxative.

Pears ought not to be eaten until they are perfectly ripe, because they have a bad juice and are very injurious. In general the greater part of pears are windy, but this quality is corrected by boiling; they are eaten raw, dried, rasped, cooked, preserved in sugar, in brandy, and in boiled wine. In countries where the vine does not grow, they make, by expressing the juice of the pear, a drink called perry. New perry is very agreeable; it resembles white wine, but it cannot be kept as cider. Excellent brandy and vinegar is obtained from the juice of the pear.

8. Lastly. The service\*, or sorb apple, (*sorba*; *sorbus domestica*, *Lin.*) is a fruit with seed of the service or sorb apple tree; one of the beautiful trees of our forest, which thrives well in the temperate climates of Europe; the fruit is small, has the form of a pear, and a rough taste. Services, when very ripe, have an agreeable taste, and are preferable to the medlar; their use is particularly proper in diarrhea from relaxation; Hippocrates used them in this disease. By fermentation, a cider is obtained from this fruit, stronger than that made from apples.†

\* This is not the service of our forest, which is a small but delicious fruit.—*Tr.*

† FRUITS. Having concluded with the author, on fruits, it may not be amiss to make a few remarks relative thereto.

1. *Apples.* In this country, apples grow in great abundance and to great perfection. Much cider and apple brandy is made from this fruit. Presuming the

## ARTICLE II.

*Of Pot-Herbs.\**

Pot-herbs, called in Latin, *olera*: are mild and almost insipid; they contain but a small quantity of mucilage: thence it is that they are not very nourishing. Those that are very sapid are used rather as a seasoning than as aliments. The most of them have a tender and very subtile tissue, but are highly acescent, and contain much carbonic acid; for this reason, they very often occasion sourness and flatulency. These effects increase in proportion as they advance in their vegetable life: hence it is necessary to free them from the carbonic acid by boiling and seasoning them.

1. Cucumbers, (*cocumis; cucumis sativus, Lin.*)

reader to be acquainted with the various species of apples, I do not deem it requisite to make any remarks on this score. Respecting the use of apples, when ripe and mellow, they are pleasant and salutary, if not used too profusely; they may be eaten raw or cooked.

2. *Cherries.* However salutary cherries may be, they certainly do not agree with many stomachs. I have frequently known the cholera morbus produced by their use when not cooked. After eating cherries, if the person experiences acidity in the stomach, accompanied with a sense of distention in this viscus, he should be apprehensive of impending dangers, and remove the cause without delay, either by vomiting or taking magnesia, chalk, or some other absorbent or alkali.

3. *Water Melon.* This fruit grows in great abundance in this country, especially in Jersey and Maryland.

4. *Persimmon.* This fruit is very abundant in the middle states of North America. Until it is perfectly ripe, it is very astringent and acerb: when fully ripe, it is of a pleasant taste, and rather laxative, but not very wholesome. It is sometimes used in cooking, combined with meal in bread, &c. Most excellent beer is made from the persimmon.—*Tr.*

\* *Pot-herbs.* Under this head some articles will be found which are not known as pot-herbs in this country.

*Aliments in general.* In passing this part of our work we find some noticed, which are not known in our country; we also find some slight difference in the manner of preparation, &c. however we do not find any differences that can materially affect the general subject.—*Tr.*

are the fruit of an annual *cucurbita* plant; the varieties of which are the white, yellow, and large fruit. There are forward plants of this kind, which afford a small green fruit, called *cornichon*, which is salted and preserved (pickled) in vinegar and salt. The custom of using copper to augment or preserve their green color is very pernicious, and ought to be absolutely proscribed. The cucumber contains much nutritive matter; Hippocrates ranked it among fattening aliments. Cucumbers are now used before they are ripe; in this state they are not very nourishing. They are watery, acescent, and cooling, hence they are esteemed in summer, but as they are not very soluble in the gastric juice, and remain a long time in the stomach they should be used moderately, especially when the stomach is weak and performs its functions slowly. They should be seasoned, otherwise there is a danger of their producing acidity, flatulency, cholics, diarrhea, in a word, the symptoms and diseases accompanying bad digestion. They are eaten raw or cooked. The seed of the cucumber are emulsive, afford oil, and are of the number of the four cold seeds.

2. The gourd or calebash (*cucurbita; cucurbita pepo, Lin.*) is the fruit of an annual *cucurbita*, (gourd) plant. Its fruit or pulp is very watery, not nourishing, but cooling and laxative. Gourds are not eaten raw, because they are insipid; they are put in pottage or soup. In general all the *cucurbita* possess the same properties; but they are laxative as has been remarked by Hippocrates, "*cucurbita* is cooling, moistening, and laxative," Lib. ii. de diæta. Their habitual use is not salutary, they produce griping pains, diarrhea and



sometimes vomiting. The *coloquintida*, (bitter apple) which is of this family, as well as the wild cucumber are violent purgatives.

3. Pumpions, (*melopepo; cucurbita melopepo, Lin.*) are the fruit of an annual plant of the cucurbita species, which is cultivated in gardens. Pumpions contain a much greater proportion of nutritive matter than the preceding vegetables; they are converted into a farinaceous substance when fully ripe, and in some countries they mix one part of this farina with two parts of wheat flour, with which they make a very nourishing bread. The seed of the pumpkin is one of the four large cold seeds. The fruit gives by expression, a very mild and good oil.

The *citrouille* differs from the pumpkin in its fruit being oblong, its color more varied, its meat not so abundant and less delicate. What has been said of the pumpkin applies to the citrouille. From both are prepared pottage, fricasee, &c. &c.

4. Alberge, (*melongena fructu oblongo violaceo, T. Inst. 151.*) the fruit of an annual plant, origin ally of Asia, Africa, and America, which is cultivated in the warm countries of Europe. There are several species of it. Tournefort distinguished this plant from the morel by its fruit which is solid, fleshy, and without a cavity, whereas that of the morel is soft and full of juice. The alberge is eaten in salad or cooked as the cucumber. The inhabitants of the Antilles, after having peeled it boil it, they then cut it into quarters, and eat it with oil and pepper. In other places it is preserved in vinegar as the cornichon. In Egypt, they roast it in ashes or boil it in water, and have it daily on their tables. It is also much eaten in

the East Indies. The alberge is supposed to be unhealthy; it is cold, insipid, and of a difficult digestion. Some modern writers think it as pernicious as the mushroom, and suppose it to be the male mandrake; hence they have called it *mala insana*.

5. Succory, (*cichorium*; *cichorium intybus*, *Lin.*) an evergreen, milky, bitter, and acrid plant, which grows throughout Europe. That which is cultivated in the gardens is not so bitter and acrid as the wild, and grows larger. The leaves only are used as an aliment, it digests easily and is slightly tonic. It may be deprived of its acrimony by bleaching. It is frequently eaten as a salad. This plant is very salutary in summer and autumn, especially to the bilious and atrabilious; it is proper in intermittent fevers. Geoffroi has seen very obstinate fevers of this class, cured by the assiduous use of the salad of succory leaves, without the aid of any other remedy. The *taraxacum* or swines snout, (*leontodon taraxacum*, *Lin.*) possesses the same properties. Its seed is one of the four lesser cold seeds.

6. Endive, white succory, frised succory, (*endivia scariola*; *chicorium endivia*, *Lin.*) The endive is an annual pot herb, and has the same properties as succory, of which I have just spoken, and of which there is but one variety. It is an excellent nourishment for horses, and may be usefully cultivated for beasts of wool. Its seed is emulsive, and one of the four cold ones.

7. White beet, (*beta alba vel pallescens, quæ cicla officinarum*; *beta cicla*, *Lin.*) a pot-herb plant; of which the leaves only are used, they are very sweet, and only contain a small quantity of mucilage. It

is the sides of the leaves of the white beet that are called *cardes*.

8. Beet, (*beta vulgaris*, *Lin.*) a biannual plant; the roots of it are eaten, they are very nourishing and cooling. Margraff obtained sugar from the plant. The roots are preserved in vinegar and salt. Reduced to a pulp they ferment, become acid and are agreeable to the taste.

9. Lettuce, (*lactuca*; *lactuca sativa*, *Lin.*) an annual pot-herb plant; both headed and non-headed, which have been cultivated in gardens from time immemorial, and the origin of which is not known. Lettuce holds the first rank among pot-herbs. It is excellent raw or cooked. It is cooling, moist, relaxing, and has less acrimony than other plants of the class of the (*semi flosculosæ*,) of which number it is, especially when it is young. It contains but a small quantity of mucilage, and is not very nourishing; it is very tender and soluble, but flatulent. The use of lettuce, according to the relation of Lanzonius and Geoffroi, has cured cases of hypochondria. It is supposed to possess the virtue of procuring sleep; but it only produces this effect by moderating the motion of the blood and reducing the animal heat, and not by a narcotic principle, for it does not possess any.

It is said that the use of lettuce will produce inebriety in man and sterility in women. It is presumable that it moderates the fire of love; but it does not entirely extinguish it. Lettuce is proper in ardent temperaments, and in all cases where it is desirable to lessen the venereal desires: But married persons, who wish to fulfil the end of matrimony, have nothing

to fear from its use. Its seed is emulsive and one of the four lesser cold ones.

10. Purslain, (*portulaca; portulaca oleracea, Lin.*) is a pot-herb, which grows in the four quarters of the world, even in Canada and Jamaica. It is succulent and cooling. Galen recommended its use in scurvy. Its seed is one of the four lesser cold ones.

11. Spinage, (*spinachia; spinachia oleracea, Lin.*) is an annual plant, originally of Arabia, and has been cultivated for about two centuries. Spinage is tender and soluble, but not very nourishing. It is ordinarily taken with much butter, which relaxes and weakens the *primæ viæ*, hence, it frequently produces fluxes and sometimes nausea, especially in persons whose stomach is naturally weak. Spinage should be seasoned.

12. Corn salad, lambs lettuce, (*valeri anella arvensis, lactuca agnina; valeirana locusta olitaria, Lin.*) is a wild annual pot-herb, of which there are many varieties. It grows every where in the fields, and vineyards; it is also cultivated in gardens, and is good to eat in spring. It is but rarely used except in salad. Broth is prepared from it, which is rendered acid with the juice of citron, and which is useful in fevers. It is also cooked with sorrel, which it sweetens. Lambs are very fond of it. In its qualities it is very similar to lettuce.

13. Sorrel, (*acetosa; rumex acetosa, Lin.*) is an acid evergreen plant, originally of the woods, but at present cultivated in gardens. There are several varieties of the sorrel, all of which contain the acidulous oxalat of potash. Sorrel is not very nourishing: It is rather used as a seasoning than as an aliment. It is



mixed with other pot-herb plants to which it communicates a sour taste. It excites an appetite and aids digestion. It is cooling and proper in all bilious cases: and it is peculiarly beneficial in scurvy; for this disease the Greenlanders mix it with scurvy grass, in oaten or barley soup.

14. Hops, vine of the north, (*lupulis; humulus lupulus, Lin.*) is an evergreen cultivated plant. The young shoots of the hops are eaten in the spring, seasoned in the same manner as asparagus. They have a slight acerb taste and an aroma, mixed with a bitter. Hops are easily digested; they increase the tone of the stomach and are aperitive, anti-scorbutic, and diuretic; they are proper in diseases of the skin, but are not very nourishing. The husks of the seed are used in brewing beer, they communicate a bitterness to it; attenuate its viscosity, and prevent it from becoming sour.

15. Cabbage, (*brassica; brassica oleracea, Lin.*) is a plant of the family of the *crucifera*, which presents a great number of species and varieties, and which was in such veneration among the ancients, according to the testimony of Pliny, as to induce Pythagoras and Cato, to write several volumes upon its marvellous properties. Its culture can be traced to the most remote antiquity. Its mildness and its sweet taste have caused it to be regarded with reason, as an excellent aliment. The water in which cabbage is boiled, exhales a very fetid odor; it precipitates mercury dissolved in nitric acid, and by distillation gives ammonia. It is likewise the same with other plants of the same family; which proves that they contain azote, since ammonia is a compound of azote and hydrogen. Ber-

tholet and other chemists have found phosphur in these plants, as well as some others of the garden plants. The cauliflower, (*brassica botrytis*, Lin.) and the brocoli, (*brassica gongylodes*, Lin.) are the most tender cabbage; they are the least flatulent and most easy to digest. The savoy, (*brassica sabauda*, Lin.) is very sweet and tender, especially its upper and middle leaves. The headed cabbage (*cabus brassica capitata*) contain the nutritive matter in great quantities.

In general, cabbage are very flatulent, owing to the great quantity of carbonic acid they contain; they in common with the *tetradynamia* plants have this acid, as is proved by the experiments of Macbride. Young cabbage, which are the most tender, are also the most windy, and as headed cabbage are longer growing than the other species, they acquire a more firm and compact tissue; hence they are more flatulent and more acescent than others. There are two species of the headed cabbage, the white and red, the latter is the sweetest and most tender.

There is a preparation of cabbage very common in the northern countries, as well as in the department of the upper and lower Rhine, known by the name of *sauer-kraut*, sour-cROUT, and which consists in making it undergo an acid fermentation. For this purpose the cabbage is finely cut up, then put into a suitable cask in layers, over each layer of cabbage, a portion of juniper berries and salt is spread, in the proportion of one and a half pounds of salt, two pounds of juniper berries, to twenty-five of the cabbage. The whole is well pressed, and the cask which should be tight is kept covered with a linen cloth and some boards,

upon which a considerable weight is to be kept, that the fermentable matter may not escape. The cabbage permits a great quantity of water to flow between the edges of the cask and boards. When the crout appears dry, a small quantity of warm water with salt and pepper in the grain is added. In this preparation, all the substance of the cabbage is not acidified; there still remains a certain quantity of the matter of sugar, which renders the sour-cROUT nourishing. Sour-cROUT is one of the best alimentary substances to prevent the scurvy: It is very proper for provisioning vessels, especially in long voyages, as sailors are subject to the scurvy.\*

16. Water cresses, (*nasturtium aquaticum*; *sisymbrium nasturtium aquaticum*, Lin.) is an evergreen water plant, which is less employed as an aliment than as a seasoning: It is acrid, a little bitter, aromatic, and contains but a small quantity of nutritive matter; it is one of the most powerful anti-scorbutics. Water cresses eaten raw, with chickens and roasted meat, is a seasoning not less agreeable than salutary; it excites the appetite. Water cresses are also eaten as a salad either alone or with other herbs. It is also pickled in vinegar. Its dietetic use is very like that of mustard. Garden cresses, common cresses, and the *capu-*

\* In this country large quantities of sour-cROUT are made in all those districts where the Germans have settled; and I take a pleasure in recommending it to the citizens of the United States in general, as a wholesome and economical article of diet. We use less salt than Tourtelle recommends, and none of the other ingredients except the cabbage.

Whilst on this subject I deem important to advise those who cultivate cabbage to any extent, and especially in sickly situations, not to have them too near their dwellings. Their leaves frequently drop off early in autumn, and putrefy and diffuse a very noxious miasma to a considerable distance, I have known whole families seriously suffer by diseases presumed to be thus generated.—Tr.

*cine* or *nasturtium indicum*, (*tropaeolum minus*, *Lin.*) possess the same qualities. The last species grows naturally in South America, whence it has been brought into Europe; and is at present cultivated in most of the gardens, of which it is a principal ornament. Its flowers are eaten as salad with other herbs, and its seed are preserved in vinegar.

17. Terragon, (*dracunculus*; *artemisia dracunculus*, *Lin.*) is an evergreen pot-herb plant, originally of southern Asia, and which is now cultivated in almost all the gardens in Europe. It has an aromatic odor and an acrid and agreeable taste. It is detergent, aperitive, excites the appetite, aids digestion, dissipates wind, provokes the courses, and promotes the secretion of the saliva. It is used as a common seasoning. It is also eaten as a salad with watery and insipid herbs, such as lettuce, the insipidness of which it corrects, and increases its taste, whilst it is young and tender. From the terragon a very agreeable vinegar is made, and one which is much used.

18. Parsley, (*petroselinum*; *apium petroselinum*, *Lin.*) is a biannual pot-herb plant, originally of Sardinia, which is cultivated in the gardens. It is used as a seasoning, is acrid and has an odor which is peculiar to it. The use of parsley is of great antiquity. It augments the secretion of urine, and its roots are among the number of the most powerful diuretics, and one of the five aperitive roots. Its leaves, by their aromatic taste, increase the flavor of other aliments which are not very sapid, and it renders soup diuretic. Its decoction produces sweats. Its seed are used in syphilis. Its seed are one of the four lesser hot seeds, which are those of smallage, parsley, bishop weed,



and wild carrots. The use of parsley is injurious to persons subject to epilepsy, increasing the frequency of the fits. (*Ephem, d'Allemande; decuria, 3 ann. iii.*) It acts in an especial manner upon the head; persons who use parsley to excess are subject to pains in the head. Sheep that eat parsley three or four times every ten days are preserved from the rot. Horses and rabbits are very fond of it.

19. Chervil, (*chaerophyllum; scandix cerefolium, Lin.*) an annual and cultivated plant, which is also one of the most common condiments; it is an exotic, and has an acid smell and taste. This plant is eaten with other herbs in salads; it renders soups agreeable, and possesses a diuretic property; it has been said that the use of it excites coughing, and that it should be refrained from by those subject or affected with breast complaints, and especially when there is a spitting of blood. There is a species of chervil, called musked, which is an evergreen, and originally from Italy, but is now cultivated in our gardens; this plant has an odor similar to that of the anise; the green grains are cut up and eaten with salads; cattle and rabbits eat the leaves of both species.

20. Radish, turnip, (*rapa*) a biannual plant, of which two principal species are distinguished—the small or true radish, (*rapa sativa rotunda; brassica rappa, Lin.*) and the female radish or turnip, (*rapa sativa oblonga seufemina; brassica napus, Lin.*) Turnips are odoriferous and have a bitter taste when young, but when they have attained a proper degree of maturity, they lose this bitter taste and become mild. The turnip of *Limousin* (*rapum or brassica rappa*) contains a mild and tender pulp, which digests easily and without producing flatulency; it is slightly



sweet, although Margraff could not obtain any sugar from it; the acrimony proper to it, is in the rind. In general turnips are not very nourishing; they are supposed to be diuretic; they are eaten raw, boiled, and roasted; they are also cooked in soups, to which they communicate a very pleasant taste. We should choose those that are tender, well nourished, having but few leaves, and long roots, sliced thin they are rendered sour in salt water; and by a process nearly similar to that of making sour-cROUT, a nourishment equally as salutary as this may be obtained. By the following process, we may obtain turnip salad in any season of the year: soak the turnip seed for twenty-four hours in water, then put them in a linen bag, which must be well tied, afterwards expose them to the strongest heat of the sun for the same length of time, and the seed will soon germinate; when they germinate, sow them in ground in tubs well exposed to the sun, and cover them with tubs exactly adapted to those that contain the earth in which the seed is sown.\* At the end of three days, there will be tops suitable for salad. In winter, warm water should be used, the tubs also should be warmed, the ground well soaked with warm water, and the tubs be kept in a good cellar.

21. Radish, (*raphanus*; *raphanus sativus*, *Lin.*) an annual pot-herb plant, which contains but little nutritive matter. The acrimony of the radish is in the rind; it is this quality which has introduced the use of this vegetable; it is not flatulent, and contains but very little nourishment; it possesses a diuretic quality. The horse-radish (*raphanus silvestris*; *cochlea-*

\* Or in other words, close portable hot-beds.—*Tr.*

*ria armoracia*, *Lin.*) is more acrid, and more eminently diuretic.

22. *Scorsonera*, (*scorzonera*; *scorzonera hispanica*, *Lin.*) a milky evergreen, pot-herb plant, originally of Spain, Siberia, and of the isle of Corsica; it was first used as a medicine in the middle of the sixteenth century; its use however did not become general until the seventeenth century. The roots of it only are used, the juice of which is milky and very sweet; it is not very nourishing, it becomes very tender when boiled, and is windy; it is recommended as a specific in malignant diseases caused by contagious miasms, by poisons, as well as against the bite of a serpent. But experience has not justified the extravagant eulogiums that have been pronounced upon its pretended virtues.

23. Goats-beard, (*tragopogon*; *tragopogon perri folium*, *Lin.*) a milky biannual plant, which grows spontaneously in the south of Europe and in England; it is cultivated in our gardens; it is very similar to the scorsonera in its alimentary and medicinal qualities, and in its botanical character; the only difference is the goats-beard is rather the most flatulent. The root of goats-beard, as well as that of scorsonera, roasted and ground, will afford a decoction similar to that of coffee, and have nearly the same odor, but not the same virtue.

24. Skirret, (*sisarum*; *sium sisarum*, *Lin.*) an evergreen plant; its roots are of a firm consistence when they are fresh, but they become very tender by boiling in water; they contain a certain quantity of feculæ, and much sugar. Margraff obtained the greatest quantity of sugar from their roots, and the

quality of that obtained was but little inferior to that made from the sugar cane. The skirret is very nourishing, not very flatulent, and easy to digest, in consequence of its aroma, which gently excites the specific sense of the stomach; it is however but little used owing to its having a disagreeable taste, similar to that of parsnips, which it retains even after it has been boiled in water. Skirret roots are eaten cooked in water, milk, soups, &c. Pliny, the naturalist, relates that the emperor Tiberius was so fond of skirrets, that he exacted them of the Germans as an annual tribute. Boerhaave esteemed them as a powerful vulnerary, and recommended them as a specific in spitting of blood, and in discharges of blood from the urinary organs.

25. Smallage or cellery, (*apium dulce*) is a variety of the *apium graveolens*, Lin. or of the smallage or marshes; it is a biannual, aromatic plant, that grows naturally in damp places, and which is rendered more mild and tender by whitening; it grows throughout Europe, but most profusely in the north. The ancients made use of it, and the Greeks still cultivate it under the name of *selinum*. The roots only are employed as an aliment; they are naturally acid, but are rendered mild by cultivation; however, they never entirely lose their acidity, not even when they are whitened. Cellery contains a certain quantity of nutritive matter, and when it has been cooked in water, it is tender and soluble, but it still retains its aroma, which gives it the property of exciting an appetite and of aiding digestion; it has been esteemed since the time of Hippocrates, as an aperitive and a diuretic; it is particularly recommended in cases of obstructions.

26. Asparagus, (*asparagus officinalis*, Lin.) an evergreen plant which grows in the sandy places throughout Europe, except in countries whose temperature is extreme; it is the young shoots of it which are eaten after being boiled; they are very tender, contain a small quantity of the matter of sugar, and are nourishing; it impregnates the urine with a particular and disagreeable odor, and contracts the belly, according to Hippocrates. Asparagus is aperitive and diuretic; it is included among the five great aperitive roots, which are the smallage, fennil, parsley, petty whin, and asparagus; but its excessive use is not without danger, it has sometimes occasioned a discharge of bloody urine. Boerhaave, and Van Swieten, his commentator, relate that asparagus has sometimes accelerated the return of paroxysms of the gout.

27. Artichoke, (*cinara; cinara scolymus*, Lin.) an evergreen plant of the family of thistles, which grows in Arabia, Europe, and South America, and of which there are several varieties. The only alimentary part of the plant is the receptacle of its flowers, and the portions of the receptacle which is removed by taking away separate shells which form the calx; the whole of this receptacle is very slightly acid, and is rendered perfectly mild by boiling in water; it then has a very tender tissue, is of an easy digestion, and contains a small quantity of the matter of sugar; is mucilaginous and consequently nourishing. The habitual use of artichokes prevent sleep. We do not know that it possesses any other remarkable quality.

28. Carrot, (*daucus; daucus carotta*, Lin.) a biannual plant, which grows naturally in the uncultivated



and arid places throughout Europe, but which is improved by culture. There are several varieties of the carrot, but all of them possess the same alimentary and medicinal qualities. It is only the roots of them that are used; they are very sweet and very nourishing, owing to the sugar they contain; they are also slightly aromatic. The carrot furnishes a light, not flatulent, and very healthy aliment, especially the orange colored. It is expectorant and diuretic.

29. Parsnip, (*pastinaca sativa*, *Lin.*) a biannual plant, originally wild, but which is now cultivated in gardens; its root is very nourishing, and contains an abundance of feculæ. Margraff obtained sugar from it; hence it has a sweet taste; it has an odor peculiar to it, and it is supposed to be diuretic; when old it acquires injurious qualities, and sometimes occasions vertigo and delirium. Willis relates that a whole family was attacked with delirium after having eaten parsnips; but this relation is doubtful. It is much more probable that this effect was produced by the roots of hemlock, which are very easy to be confounded with those of parsnips, as much from the relation of their sweet taste, as in consequence of the resemblance of the two plants.

30. Garlic, (*allium*) a bulbous evergreen plant, originally from Sicily; there are three species of it: 1. common garlic, (*allium vulgare*; *allium sativum*, *Lin.*) 2. ascalonicum, (*allium ascalonicum*, *Lin.*) 3. rocomble, (*allium scorodoprasum*, *Lin.*) Their roots and leaves have a very strong and penetrating odor. Garlic is employed rather as a condiment, than as a common aliment; nevertheless, all these species possess a nutritive matter, and in warm countries, where



the garlic is not very acrid, it is nourishing. Garlic is every where made use of; it excites an appetite and aids digestion; it produces transpiration and sweat, no doubt in consequence of the aroma which it contains; and when it does not produce this effect, it augments the secretion of urine. Garlic is eaten raw or cooked; meats are seasoned with it; it is much more acrid in the north than in any other place; it contains entire formed sulphur.

31. Onions, (*cepa; allium cepa, Lin.*) are a biannual bulbous, pot-herb vegetable, originally of Africa, of which there are many varieties, among others the civis, (*cepa fissilis; allium schænoprasum, Lin.*) which, like garlic, are used for seasoning meats. The root of the onion has a kind of volatile acrimony, which gives it a strong and pungent taste, especially in the north; it is milder in the southern countries; it is nourishing and contains sugar and sulphur. When its acrimony is dissipated by boiling, it has a slightly sweetish taste. The onion, as well as all the garlics, is diuretic and produces transpiration; in addition to these qualities, it possesses the incisive expectorative virtue; but its excessive or long continued use is not without danger. Spigelius has observed, that it deranges the cerebral functions. The Icthyophagus nations make very great use of the onion as well as garlic; and it appears from experience that their roots are the most appropriate seasoning for fish. Ramazina relates that the use of garlic and onions cooked, cured an epidemic fever, which exercised its ravages in many countries, and which was occasioned by the great quantity of fish that the inhabitants eat.

32. Leeks, (*porrum; allium porrum, Lin.*) are a pot-herb plant, of which there exists two species, and which are only used as a seasoning; they are difficult to digest, gluey, and flatulent, but provoke the urine and courses, and communicate their action, in an especial manner, to the parts of generation, of which they excite the play; they possess the other properties of garlic.

33. Mushrooms, (*fungi*) a family of plants that comprehends several genera, a great number of species and varieties; they grow in the ground at its surface, upon living vegetables, and upon decomposed vegetable and animal substances; they are met with throughout Europe, except in the countries of the north,

Mushrooms are vegetables of an animal nature, which, though very nourishing and very agreeable to the taste, are, nevertheless, to be feared; some are unhealthy, others produce death, and all are difficult to digest; the least unhealthy are those that grow in dry places; they are dangerous in wet places, and putrefy in them, and also from being gathered too late. However, sensuality has always overcome dangers, and the ancients were as great epicures as the moderns are. Nero used to call mushrooms the *ragout* of the gods, because Claudius, whom he succeeded, poisoned by them, was raised after his death to the rank of the gods. Moreover, mushrooms are raised in beds of manure, and in the open fields, they are also cultivated in gardens in every season. The mushrooms that grow in beds are the most used. The *masters of the science of the palate*, to make use of the expression of Montaigne, suppose they can distinguish

to a certainty, good mushrooms from bad. The good, in their opinion, are those that acquire their growth in one night, which are of a middle size, about as large as a chestnut, fleshy, rich, white above and redish underneath, of a firm consistence, softish interiorly, and of an agreeable taste and smell; the pernicious are those of contrary qualities, or which having remained long upon the ground, have become blue, red, or blackish. But these general marks are very uncertain, and not sufficient to insure them; and we may say from experience, that in general all mushrooms are to be feared, if we except the morille, (*phallus esculentus*, *Lin.*) which is not dangerous, unless it has been injured by insects, and the mushroom in the form of a mitre, (*helvella mitra*,) the others are generally poisonous.

It is pretended that there are certain species of them, the odor of which produces in some persons epilepsy or insanity; and many are poisoned from eating them; they do not give any acid by distillation, but ammonia. Subjected to fermentation, they do not give any acid, and putrefy immediately. The poisonous effects of mushrooms are ordinarily slow; sometimes their action does not develope itself until after twelve and even twenty-four hours; it is manifested by a violent cholera or oppression, bloody urine, a tension of the stomach and belly, cardialgia, griping pains in the bowels, a burning thirst, delirium, swelling of the hypochondriac regions, anxiety, and an inexpressible agony, protraction of strength, syncope, hiccough, cold extremities, cold sweat, an universal tremor, gangrene; in a word, all the symptoms of approaching death. However all these dread-

ful phenomena do not take place at the same time, nor to the same degree of violence in every person; which must be attributed to the greater or less quantity of poison taken, to the greater or less sensibility of the stomach, and to a great number of other circumstances. Vomiting is very salutary in these cases when early applied, it removes in this case a part of the poison, and sometimes there remains so little in the *primæ viæ* after this evacuation, that the patient appears entirely recovered. But we have not less to fear in the end, and such affections as are occasioned by other poisons, are afterwards almost always manifested. Such as cramps, contraction of the members, paralytic affections, and a state of weakness and langor, which inevitably brings on death, when the patient is not timely relieved.

To cure persons poisoned by mushrooms, it is necessary to puke and purge powerfully, and as soon as possible, and at the same time to administer a large quantity of mucilaginous or oily drinks, such as a decoction of marsh mallows and flaxseed, also oil and milk. Purgative injections are also employed with success, as well as baths and emollient fomentations. When sufficient evacuations are procured, a small quantity of sulphuric ether should be taken in each glass of drink. This remedy, from the experience of Paulet and Parmentier, and all those who have been attentive to animals poisoned by mushrooms, is the one which has been most salutary, and has the most effectually calmed the disorders which subsist after the necessary evacuations. It is at first given in doses of one and gradually two drachms, when the stomach can support it. Finally, when the disease is entirely



removed, except the consequent debility, cordials and especially wine is to be administered, and succulent aliments of easy digestion are to be given in small quantities, at the commencement of the convalescence.

34. Truffle, or swine beard, (*tuber; lycoperdon tuber, Lin.*) is of the mushroom family, and grows underground without roots, stalks, or leaves. It has an insipid odor, nearly similar to the semen masulinum. It was used by the ancient Romans. It grows in great abundance in the departments of Dordogne. The truffle is supposed to be an aphrodisiacum. Previously to eating it is peeled, and when black used, when white it is insipid. The truffle of Italy or the southern departments of France, has a much stronger taste and perfume than that of other countries: It exhales so strong an odor that the hogs and dogs in rooting the earth, can discover it by the smell, and root it from the ground. Although the truffle is very nourishing, it is nevertheless a very unhealthy aliment, of a difficult solution, and passes very soon into the putred fermentation. It is of the family of the fungi, the most of which are pernicious, and nearly all suspicious. It is prudent not to use them, or only to eat them in small quantities. The truffle is preserved in oil, or dry and in powder; it is cooked and seasoned: It perfumes meat. A variety, which is white, have been discovered in the north; this has not as much aroma, nor is it so agreeable to the taste as that of the warm countries.



## ARTICLE III.

*Of Grains.*

There are two species of grain or seed: The graminous (*cerealia*) and the leguminous (*legumina*.)

SECT. 1. *Of the graminous.* The gramina are very nourishing, owing to the feculæ and the matter of sugar which they contain. Their leaves serve as a nourishment for cattle; and the smallest of their grains for fowls and birds. The most of them are used by man for aliment, in nearly all the countries of the known world. They are all salutary, except the darnel and *covette*, which appear to be poisonous.

It is no doubt owing to their great utility, or rather the necessity which mankind has for them, that nature has so abundantly multiplied these plants in all the inhabitable climates, and that their seed is so formed as to be transported to a great distance by the winds. These cosmopolite vegetables grow in every place where there is earth, and they fill the smallest spaces. Their stalks and their leaves do not break easily, but raise up after having been trodden under foot: The most gentle rain renews their verdure, when they have been dried by the heat of the sun.

The feculæ is a nutritive substance, very abundantly diffused in the vegetable kingdom; the greatest quantity of this precious matter is in the grain, and especially in those of the gramina; it is deposited in them to serve as nutrition, and for the development of the germ of the plant. It is a nourishment quite prepared and as it were digested by the mother plant, for

the support of the embryo at the commencement of life, when it is too feeble to extract its proper nourishment from the earth and air. Man has discovered it by a kind of instinct, in the grains of the gramina, and it is an aliment peculiarly adapted to his nature, and one which has a preference over most others. It is probable he began the use of these grains by grinding them between his teeth, and, like animals, by confining himself to those that grow spontaneously here and there upon the surface of the earth. But his intellectual faculties which distinguish him from other animals, induced him afterwards to endeavor to multiply these plants, by cultivation, to separate the flour of the grains, and finally, to prepare it in a manner which renders it most agreeable to the taste, and the most easy to digest. The multiplied endeavors which he was obliged to make previous to his attaining the point which we have reached, supposes a long series of ages, and the great antiquity of man. How many attempts had he not to make, and how many arts had he not to invent to accomplish his end! It is a fact, that the use of the gramina and their cultivation began thousands of centuries ago, and that they constitute the basis of the nourishment of the most of nations, whether civilized or savage.\*

\* The first advancement in the arts was the result of reflections excited by the operations of nature. It has been remarked that grain was first eaten without any preparation, was ground by the teeth, mixed with the saliva, and that it afterwards experienced the heat of the stomach. It was supposed that by imitating these natural processes, a more agreeable aliment and one more easy to digest, might be made from grain, and the supposition has been realized. Thus the teeth served as models for mills, the tongue and the saliva gave the idea of the kneading trough, and the stomach that of an oven. The dough was baked in the ashes for centuries, before the oven was invented. Ovens have, however, been very long in use; they were used in the time of Abraham. When the means of separating the mea

1. Barley, (*hordeum*) is an annual plant of which there are four species; 1. Common barley, (*hordeum vulgare*, *Lin.*) which is a native of Sicily and Russia; 2. Two ranked barley, (*orge de mars*; *hordeum distychem*, *Lin.*) originally of Tartary and Siberia, where it grows spontaneously in the mountains, if we credit the relation of Heinzelmann; 3. Six rowed barley, (*hordeum hexastichum*, *Lin.*) this is the species the brewers prefer for beer; 4. Lastly, the German rice, (*hordeum zeasticum*, *Lin.*) The flour of barley is sweet and has been employed as an aliment from time immemorial, according to the history of Pliny. The inhabitants of the Alps and the northern nations still use it for bread. The reason why barley is cultivated in preference to other grains in cold countries is, its ripening so soon. Linnæus says that in the most remote countries of the north, they gather it in fifty-five or fifty-eight days after sowing it. Bread made of barley meal has the defect of becoming very dry. Germination develops in barley, as well as in the other seed of the gramina, the matter of sugar, and hence it so easily contracts the vinous fermentation; but this fermentation is sooner and more completely excited in barley than in any other grain: This is the reason why it is most generally used for brewing beer, which is only a decoction of the meal of barley germinated and afterwards dried, that is fermented by means of yest, and in which hops are used. Beer is the drink in use among the northern nations. These nations also

from the bran was discovered, the making of bread was still unknown; a kind of soup made with meal and water was long eaten. This custom is still prevalent among the Scotch mountaineers and many other nations.

obtain a brandy from barley, which they call *brandy of grain*.

Barley is cooling and acescent: Its use is salutary in all bilious and atrabilious cases, as well as in all those where the humoral systems strongly tends to an alkalulent state. Aristotle said that barley was not very nourishing; but experience has proved his opinion to be erroneous: Whole nations make it their principal nourishment, and they enjoy very good health. Celsus considered it as an aliment of a bad juice, this opinion was not better founded than that of Aristotle.

Barley is very nourishing, even in a state of malt. Malt, having undergone the first state of fermentation, possesses an antiseptic virtue, which renders it useful to prevent and to cure the scurvy. With this view the English make it an important article in provisioning their vessels for long voyages, especially towards the north.

Barley is used, after having been deprived of its chaff. That which is slightly bruised, to remove the skin, is called shelled barley, and that which undergoes a kind of preparation, making it resemble the millet, is called pearl barley. When we use barley which is deprived of its skin and has been kept long, it is necessary to take care that it is not musty, as it very easily contracts this quality. To obviate an inconvenience of this nature, it should be washed several times; this precaution is advisable, even should there be no obvious appearance of must.

The ancients prescribed barley in a liquid form, as an aliment in acute diseases; they gave it the name of *tisane* of which they made three species. The first

was a decoction of one part of the shelled barley in ten or fifteen of water; they boiled it until the barley being perfectly dissolved formed one mass; this they called tisane, or non-strained tisane. When they gave it in very acute diseases, they filtered it to separate the liquor from the grain; this second species they called filtered tisane, (*ptisana græcorum transcolata*) juice of tisane. It is this species which Hippocrates recommends as the best and mildest of aliments: "It is light, pleasant, consistent, emollient, extinguishing thirst, and easily passes off." The Latin and Arabian physicians employed a third kind of tisane which they made of common barley, and which they boiled in water, but this is simply a drink and cannot be considered as an aliment. The moderns only use the second species of it in acute diseases, and it is known by the name of juice or cream of barley.\*

Barley when mixed with corn, in the proportion of one third, or one half, makes a very good bread; by itself it makes one of a very inferior quality, and which is only proper for those who have very strong stomachs, and those engaged in hard labor, for it is difficult to digest. In Pliny's day, the Athenian gladiators, who were in the habit of living on barley, were surnamed *hordeati*. The *maza* or oily dough of the ancients was composed of the meal of torified barley, mixed and kneaded with some liquid, as water, oil, milk, boiled wine, honey, &c. they also made a pap, called *polenta* from this grain.

2. Oats, (*avena; avena sativa, Lin.*) an annual ce-

\* In this country, barley water is much used in acute diseases. In bilious or autumnal diseases; it may be improved by the addition of currant, raspberry, or strawberry jelly.—T<sup>h</sup>.



*realea* plant, of which there are two principal varieties, the white and the black. We do not know any country where it grows spontaneously, and it is very doubtful whether it was oats which Anson found in an island of the Northern sea. The grain of the oats has but little meal; that which it affords, has not a very sweet taste, and is less acescent than that of the other grains. When oats are converted into malt, they easily ferment, but do not make a very strong beer. Oat meal serves as nourishment to many of the southern nations of Europe.

Oats possess the same qualities as barley, and are proper in the same circumstances. Although Galen regarded them as an unhealthy aliment, yet the contrary is proved to be the fact, by the experience of those nations who use oats as a nourishment without any inconvenience. Pliny says the ancient Germans lived principally upon boiled oats. The Scotch and those who inhabit the north of England, have no other gramina for nourishment, and yet they are very strong and very robust. Besides, granivorous animals that live on oats, do very well. Creams or gruels are made with it, which are not only pleasant to the taste, but digest easily. The inhabitants of the southern parts of Switzerland make a very nourishing soup with the meal of roasted oats. Oat bread is black, bitter, and digests with difficulty.

3. Buck-wheat, sarrazin, (*fagopyrum*, or *frumentum saracenium*; *polygonum fagopyrum*, Lin.) an annual branchy plant, whose fruit resembles that of the beach, and which is an original of Asia, whence it was brought into Europe in the fourteenth century; a bread is made with it, which is black, not consistent,

but of a better taste than that made of barley; this bread is moist and easy to digest, but not very nourishing; it passes off very soon, and produces more flatus than rye bread. Soups are also made with buck-wheat flour, they are of a greyish color, and are recommended to those habitually subject to costiveness. The sarrazin of Tartary is preferable inasmuch as it supports the cold, and its grain is larger and ripens earlier than the other varieties.

4. Maize; wheat of Turkey, Spain, and India, *cara* of the Peruvians, (*zea mays*, *Lin.*) an annual plant originally of America, where it has been cultivated from time immemorial, it has been naturalized in all the temperate countries of Europe, where it was brought at the commencement of the sixteenth century; it affords a meal which is very nourishing and pleasant to the taste, it hardens by ripening, and when it is dry, it is easily reduced into meal; it is not acescent; it is not susceptible of fermentation, even with yeast, so as to make light bread, but by mixing corn and wheat flour, an excellent light bread may be obtained. Indian corn contains much feculæ and sugar, and is very nourishing. With meal and water or milk, a kind of hasty-pudding or pap is made, called *gaudes*, *polente*, *miliasse*, *cruchades*, which is not only pleasant to the taste but easy to digest. It constitutes a great part of the nourishment of the country people in the departments of Daubs, Haute-Saone, Jura, &c.; it does not occasion the itch, for this disease in these provinces, as well as in every other place, is generally owing to a want of cleanliness; and the itch is not more prevalent in countries where they

habitually use corn, than in those where this article is unknown as an aliment.

By the following process, a very delicious diet is made with maize: Gather the young ears when of the size of the little finger, split them and fry them with dough as the artichoke. The young ear is also pickled in vinegar like cucumbers. The Americans extract from this grain, peeled and macerated in water, an inebriating vinous liquor, which affords alcohol by distillation.

The corn stalk contains a juice of the same nature as that of the sugar cane. A very sweet syrup possessing the real taste of the sugar, may be made from it. Maize is subject to excrescences, which become converted into a black non-contagious powder; this disease is remedied by extirpating the excrescences as soon as they appear.\*

5. Millet, (*milium*; *panicum miliaceum*, *Lin.*) an annual plant, originally of India, of which there are several varieties. Millet meal is sweetish, slightly acid, and digests pretty easily when used in the form of pap; it formerly constituted the nourishment of the Ethiopians and of the Sarmatians. Hippocrates supposed it constipated the bowels. They make bread with it in some parts of France, but it is viscous, heavy, compact, and digests with difficulty.

6. Rice, (*oryza sativa*, *Lin.*) is an original of India, Nigritia, of the Phillippine isles, and of America; at

\* On the subject of Indian corn, we are quite at home. Our matrons can make good bread, and even that which is light, from its meal, without the addition of wheat flour. It also furnishes us with mush, hominy, puddings, &c. &c. of a most excellent quality. I do suspect that it is not so salutary as wheat bread to those habitually subject to lax bowels.—*Tr.*

present it is cultivated in all the eastern countries, also in Carolina, Georgia, Jamaica, Italy, and Spain. The rice of the east and that of Spain is red; that of Carolina white, and of larger grains. Rice is now used in all Europe, and it has become the general nourishment of many nations; it is sweet, a little acescent, and slightly fermentable; it is very nourishing, easy to digest, and is not an astringent, as is generally supposed; it is sometimes salutary in diarrhea and dysentery, in consequence of its mucilage.

Divers alimentary preparations are made with rice, which are very agreeable and very salutary. Boiled in water to a certain consistency, and then strained, it furnishes a cream or water possessing the same virtues as that of barley, and which is proper in the same cases; both are frequently prescribed in acute diseases. It is thought that a good bread is made with the meal of rice mixed with wheat flour.

Citizen Bernard, physician, read at the convention of the academy of *Beziers*, held the eighth of November, 1786, a memoir tending to prove that the habitual use of rice is not exempt from danger, and that it occasions extraordinary affections. He supported his opinion by the testimony of Bontius, who pretends that the abuse of rice is essentially communicated to the nerves, that it considerably weakens the sight, and even causes total blindness. He cited the observations of a merchant of *Beziers*, who, after having used rice for sometime, being very fond of it, without experiencing any inconvenience, became suddenly subject to frequent sneezings, and to a swelling of the visage, which manifested itself when he took some spoonfuls of rice, and ceased as soon as its digestion



terminated. The late *Conte de Manse*, some time after the memoir above alluded to was read, informed that after eating rice, he had several times experienced similar effects, to remove which he fortuitously discovered the powerful tonic effects of cold applied to the parts affected. He guarded against the pernicious effects of rice by having it torrefied or scorched previous to preparing it for the table. It thence appears that rice contains something noxious; in fact, poisons frequently produce swellings in different parts of the body. Rice, however, is innocent, it is only its abuse that is pernicious, and all mucilages may produce similar sympathetic phenomena. This position is proved by a multitude of facts. Tissot relates a patient, who, every time he took manna, had frequent sneezings, which did not cease until it had passed from his stomach. The celebrated Porta speaks of a young lady who was very slightly affected by sternutatories, but who sneezed thirty or forty times after taking a small quantity of Spanish wine. Boerhaave relates it as a fact, that certain fruits even of a good quality, the first time they are used, have occasioned swellings of this species. What shall we conclude from thence? Unless it be that the gastric sense in certain individuals, is affected in a particular manner by certain substances, and that the sympathetic irradiations which shoot from the stomach in these cases, affect in preference such and such parts, according to the state of analogy, in which they are with this viscus. It is probable that the excessive or long continued use of rice, as well as of other substances of this genus, weakens the stomach, and occasions an atonic spasm in this viscus, which, radiating upon the



nerves of the pituitary membrane, and upon the cellular tissue of the face, produces sneezing and swellings. Cold water, which possesses a tonic virtue,\* removes these diseases by dissipating the spasm; and the roasting of the rice prevents them, by depriving it of a considerable portion of its mucilage, in which the asthenic power resides.

7. Rye, (*secale*; *secale cereale*, *Lin.*) an annual cerealea plant, which grows spontaneously in Siberia. It is uncertain whether the ancients cultivated this grain. From the description which Pliny has given of it, that of the ancients appears to have been different from ours. Many botanists suppose the rye of the ancients to have been the *siligo*. Nonnius says that it was the *contenum* of Isidorus, that the Spaniards designated it under the same name. Rye meal is sweetish and blackish, and contains a small proportion of gluten; it is very acescent, and when one is not accustomed to its use, it very soon sours in the stomach, and produces a purging. Rye bread constitutes, nevertheless, the principal nourishment of the inhabitants of the north, (Europe) and of the mountaineers; they make their cakes of it, which are as hard as ship biscuit, and which keep the whole year.

\* *On the effects of cold water.* The effects here attributed to cold, may, I conceive, be more satisfactorily accounted for by supposing it a sedative, than by attributing them to any tonic properties that it may be supposed to possess. If rice produces these noxious effects it must necessarily act as a morbid stimulus, because these diseases are of asthenic nature. Sneezing never takes place except from an increased excitement of the pituitary membrane; and the swelling of the visage is, no doubt, accompanied with other symptoms of increased excitement; as are swellings of this part of the system from other morbid causes, supposing this to be the case, and that this increased excitement distends the muscles of the face; when the cold water is applied this cause of distension is dissipated, by a well known physical law, and the muscles contract to their natural dimensions. See Williamson's observations on cold, Medical Museum, Vol. 6, No. 2.—T.

The strength and vigor of those people permits them to use it, and even renders it necessary. Brandy is also obtained from rye meal, by fermenting it in water, and afterwards distilling it.

Rye is subject to a disease known by the name of clou, ergot, (*ustilago*.) It originates in the heads that are longer than others, which are sometimes straight and at others crooked, brown or black, and have a roughish surface; three furrows are frequently seen extending from one end of the head to the other; sometimes cavities are observed which appear to be the work of insects. In the interior of the ergot grain, we find a pretty white flour, covered with a redish or brown layer, which, although possessing a certain consistency, can be mashed between the fingers. When these grains are put in water, they float, but on becoming saturated with water, sink. If we chew them, they leave a strong and poignant impression upon the tongue.

The redish or brown flour contained in the ergot grain, which presents the form of an elongated capsule, resembling a horn or the spur of a cock, contains an acid, which precipitates chalk dissolved in water, as was proved by the experiments of citizen *Girad Chuntrans*; this article has an irritating and septic quality, and is a real poison, when a certain quantity of it is used in bread. If this rye is used alone, it produces certain death, after having caused convulsions, acute pains in the exterior parts, numbness, and intoxication. Its inebriating quality is even superior to that of opium. It generally produces in the members, such as the thighs, legs, feet, arms, and hands, a kind of dry gangrene, called *ustilaginous*,

and which is of such a nature, that after having been affected with pain and stupor, they wither and ordinarily dry up without tumefaction, and afterwards completely lose the sense of touch and the power of motion, and spontaneously fall off without bleeding. Persons have been affected with this terrible malady, whose trunks or bodies only were left, and who have, notwithstanding, lived in this state for several days.

This disease of the rye occurs in rainy years and in marshy places, such as those of *Solonge*, near Orleans, *Blaisois*, *Gatinois*, and in the environs of *Bourges*, (France.)

The serious diseases which are occasioned by ergot rye, are ordinarily followed by death, and commonly prevail from the time of harvest until winter; they are epidemic, when there is a scarcity of corn, and there is a necessity of using the diseased rye. This gangrene attacks a greater number of men than women. That which was epidemic in Solonge, affected the lower extremities more frequently than it did the upper.

There are physicians who think that this disease was not the effect of ergot rye, but rather that it was produced by bad weather. In fact, in 1749—50, a similar epidemic prevailed in Flanders, which committed great ravages on the poor country people, especially those who inhabit damp houses; it was preceded by great vicissitudes of weather and the plague of war. But it has been proved by experiments made upon different animals, that ergot rye is a real poison, which produces death in a very short time. Some of those animals that were affected with the disease in

question, were relieved by the use of milk; this remedy might be used with persons afflicted by the use of ergot rye. Some physicians attribute the ergot to a defect of the fecundation; they found their opinion upon germs never having been found in the ergot grains. Tillet and Duhamel suppose it is occasioned by the prick of the caterpillar which produces a kind of scab upon the grains of rye.\*

8. Wheat, (*triticum*) an annual cereala plant, of which there are several species, (such as the *triticum æstivum*, *hybernum*, *spelta*, *Lin.*) and which may be esteemed the most useful cosmopolite. Each climate produces the species of grain proper to it; but wheat, which serves the most of the civilized nations as a nourishment, supports equally well the extremes of temperature—heat and cold. It grows as well in the northern countries as it does in Barbary. We do not know in what country it originated, perhaps it was at first a grass, trodden under foot, which has been brought to its present state of perfection by culture; for daily experience proves to us that man has a kind of empire, and exercises an almost creative power over the productions of nature, that he embellishes, improves, and changes them almost at his pleasure by his labor and care. Some think Sicily is the native country of wheat. Linnæus, since Heinzelman, pretends that it grows spontaneously, as well as barley, among the Baschkirriens, (in Russian Tartary.) There is no surer means of ascertaining its origin than its degeneration. It is probable that the wheat of our country is the same as that called by the ancients *pyros*, which resembles that of Sicily, the grain of which is reddish

\* Within the last few years, the ergot has become a fashionable medicine in our country, in certain female complaints.—*Tr.*



and very hard; ours is more tender. It is the same as that cultivated in Egypt, Greece, and among the eastern nations; however, it is scarcely possible to determine the varieties of it, from the description of the ancients or even the moderns.

Wheat constitutes the principal nourishment of nearly all the nations of the old continent. This precious gift of the Creator is always renewing; it is reproduced and perpetuated with a prodigious fecundity for the support and preservation of the human species. Its meal or flour, deprived of bran, is used in an infinitude of ways. Brandy is obtained from it, but this manner of using it, would be criminal in the midst of the rich vineyards which embellish our hills. Starch is made from wheat, but as many of the common plants of our country contain much of this substance, they should supercede the use of it for this purpose. Lastly, it is very usefully employed for making bread, by kneading its flour with water and yest, to excite a fermentation, which is afterwards stopped by baking the dough to a proper degree, and which constitutes bread. Besides the feculæ and the matter of sugar, which wheat flour contains, as well as that of the other gramina, it also has a particular substance, discovered by Biccaria, which has been called *vegeto-animal* substance, and which is now known by the name of gluten or glutinous substance: This substance is of the nature, and has the same properties as the gluten or fibrous part of the blood and muscles. It may be easily obtained by repeatedly washing the flour in warm water, which dissolves the feculæ and matter of sugar, and permits the gluten which is soluble, to precipitate. It has the character of the most



highly animalized substances; it is naturally concrete, elastic, and ductile, and has a fibrous or membranous form; a sweet taste and the odor of the semen masculinum; it burns in the same manner as animal substances, gives by distillation a great quantity of azotic gas and ammonia, is dissolved in part by alcohol, and runs into putrefaction, without previously experiencing the vinous or acetic fermentation; by the contact of nitric acid it becomes of a yellow color, and gives out the azotic gas, and is converted into the oxalic acid. Gluten differs from the feculæ or substance of starch, the latter being pulverisable, dry, white, insipid, combustible, affording much *pyro mucous* acid by distillation; being soluble in warm water, and forming with it a jelly or paste: It is changed into the malic and oxalic acid by means of the nitric acid, and passes spontaneously into the acid fermentation. Feculæ exists in all the white and pulverisable vegetable substances, and especially in the tuberous roots and the seed of the gramina. Gluten differs from the mucous, the latter being sweet and viscous, it gives as well as the feculæ, much *pyro mucous* acid by distillation, and is soluble in warm or cold water. It is insoluble in alcohol, susceptible of being coagulated by means of the weak acids, burns without giving flame, and affords a great quantity of carbonic acid by combustion. Light does not appear to concur much in its formation, for plants that grow in subterraneous places are abundantly provided with it. Gums are only dried mucilages. Finally, it differs from sugar, the latter having a stimulating and agreeable taste, is soluble, crystalizable, and has the property of passing into the vinous fermentation, and of being converted into alco-

hol. All these substances are composed of carbon, hydrogen, and oxygen; they differ from one another only in the different proportions of these principles, and of the gluten, and by the presence of azote, which is contained in this vegetable production in a large quantity.

It has been demonstrated, that it is the gluten of wheat which causes it to experience a particular order of fermentation, from which results a bread superior to that made from the other gramina. If we add this substance to the meal of the other gramina, we obtain a better raised bread, one which is lighter and softer, in a word, a more agreeable and more salutary bread than that made from their meal which is not exposed to this mixture. We thence see that wheat is, of all others, the gramina, which furnishes man with the most proper nourishment, and which is the most conformable to his nature. It alone combines all the vegetable and animal alimentary substances, in the different principles which it possesses: Consequently, it is the most precious and most salutary aliment; it suits every age and every constitution, and at the same time, it contains the greatest quantity of nutritive matter; it also furnishes but a small quantity of excrements. *Triticum*, (says Hippocrates) *fortius est hordeo et magis nutrit, minus autem per album secedit*.

Bread is an object which merits the greatest consideration, in regard to economy and health. Experience has taught us the value of the following precepts. 1. Grain which is sound and of a good quality, though more costly than the bad, makes the cheapest and best bread. 2. New wheat and new rye,

are not wholesome, especially when the year has been wet. Those who labor should make use of that which has been kept at least through the winter. It is also economy, for new wheat and rye do not give so much meal as those which are old.

3. Wheat and rye should not be ground together, because the grain of the rye being smaller than that of the wheat, the grinding has not an equal influence on both: it is better to mix the meal after having been separately ground.

4. When the burrs or stones run too fast or are too close, the bran becomes fine and passes with the meal into the bolting cloth; it weighs more in fact, but does not make a nourishing bread; besides this bread remains damp and moulds quickly.

5. By means of economical grinding, we may obtain eight distinct productions from wheat. We obtain from eighty to ninety pounds of flour per quintal.

6. When the bran is too coarse, and when it contains much meal, it should be soaked in water during a night, and this water filtered through a linen, previous to making bread of it.

7. When the grain is not sufficiently ground, there remains in the meal entire pieces of it, which is a clear loss.

8. The meal is better when it has been made for a month, than when quite fresh.

9. Flour should not be kept near stables, nor near any place from which bad odors are exhaled. Meal sacks or bags should stand upon boards and not upon the ground; they should also be turned from time to time, to admit the air to every side of them.

10. When the meal is made from a good, sound, and well made grain, fifteen pounds take from seven to eight of water.

11. Old leaven or yeast gives the bread a sour taste.

12. When we do not frequently make bread, the yeast should be kept very warm to preserve its strength, and sweetened every day; that is to say, a little flour and water should be added to it.

13. To make good rising, more than half of the flour of which we wish to make bread should be employed.

14. All potable waters are good for making bread, however, it should be poured into the bread trough through a linen. It is necessary that the water should be warm, but never boiling, not even in winter; when we wish to use cold water as in summer, the dough must be kneaded more than when warm water is employed.

15. All the dough should be kneaded until it no longer adheres to the hand. The more it is kneaded the better will be the bread. Kneading is thence of the greatest utility. It is only by means of it that the flour is intimately united with the air and water, an union absolutely necessary for the uniformity and quickness of the fermentation.

16. When the dough is made, and when put to rise under a cover, it is particularly necessary that this should be a proper one; without this precaution the bread contracts a bad odor and does not rise sufficiently.

17. Old wood which has been painted is dangerous to heat the oven with, it communicates a bad quality to the bread.

18. When the dough is sufficiently raised, it should be put into an oven without delay, otherwise it ferments too much and sours, and care should be taken that the oven be not too warm nor too cold, and that the heat be equally diffused throughout.

19. Loaves which are too large bake badly.

20. Bread should be left to sweat and to cool before it is eaten, not only that it may not be injurious but also that it may last the longer.

21. Coarse bread, or brown bread keeps the bowels open, but is not very nourishing.\* White bread of fine flour, well separated from the bran, is very nourishing, and makes but a small quantity of excrements. That which is made with yeast digests very easily: heavy bread is more difficult to digest, but is more nourishing.

22. Fresh bread well baked, or baked twice, (*biscoctus*) which is not warm, is better than old bread.† Old flour makes bad bread.

The best bread is that which is light, white, full of holes, made of good wheat meal, or wheat and a little rye mixed, well raised and properly cooked. That which unites all these qualities digests easily, and is very nourishing. Bread should be eaten fresh but not warm, otherwise it does not digest so easily and occasions flatulency.

It is to the happy invention of rising dough, previous to baking it, that the perfection of bread is owing. Fermented bread differs considerably from that which is heavy; it is not only less compact, lighter and of a more agreeable taste, but it also soaks more

\* De vict. rat. lib. ii.

† Ibid.



easily, and does not, as the heavy, form a glutinous bread, which makes it digest much better.

Divers alimentary preparations are made with wheat flour. such as *vermicelli*, *macaroni*, *semoules*, &c. But in general, all the doughs, pastes, in a word, the non-fermented flour of gramina, do not digest easily in weak stomachs; they frequently turn sour, produce cholics, flatus and diarrhea. These dishes are only proper for strong and robust men, who require proper nourishment to exercise in an energetic manner the digestive energies, as has been previously remarked. Such were the ancient Romans, who made a habitual use of pap: Such are also, at present, many nations who are robust, and who make it their principal nourishment. Nevertheless, these examples do not justify its pernicious use for children of the first age, and especially those of towns or cities; their stomachs are not sufficiently strong to digest it. Hence, multiplied observations have proved that it is to this nourishment that the greater part of the diseases of infancy are owing; such as griping pains, worms, engorgements of the mesenterry, dropsy, cholics, flatulency, diarrhea, convulsions, rickets, scrophula, and a multitude of other not less dangerous affections.

“All physicians see and describe these diseases,” says Zimmerman, “and none can prevent them, owing to the blind obstinacy of the women, and of the people in general. How happens it that out of twenty-five thousand deaths that occur in London every year, eight thousand children die of convulsions, if it is not because their stomachs and intestines are stuffed with an aliment (pap) which poisons them? But it would

be easier to transport the Alps into the vast plains of Asia, than to convert an obstinate woman.”\*

As wheat makes the principal nourishment of man, it is very essential to know the proper means of preserving it. The two greatest obstacles that influence it are the insects which destroy it, and the fermentation which injures it.

The insect which destroys wheat is of the moth species, known by the name of wheat-fly, and resembles in many respects false blades. The female lays eighty or ninety eggs, from which, within eight days, little caterpillars appear; these lodge between the blades of the grain, and destroy the skin, and introduce themselves. Afterwards they eat the interior, and weave a *cod* in it, where they remain closed until the fly comes out of the nymphia. It only requires twenty-eight or twenty-nine hours for a generation, so prodigious is their increase. The most efficacious means of preserving wheat, is to pass it through an oven or kiln, the heat of which kills these insects. The grain can support a heat of ninety degrees without injury, which is about that of an oven when the bread is drawn out of it. If the grain is put in at this period, the heat soon diminishes, and the thermometer descends in twelve hours to thirty-three degrees. Before sowing the wheat, it were well to wash it, and throw away all the grains that swim. This precaution also guards against the accident called rust.

The weavel is nourished by the mealy substance of the wheat, and causes terrible havoc from their prodigious multiplication. All the means that have been

\* Traite de l'Experience, tome iii. p. 56

hitherto suggested, to secure wheat from their ravages, have been either insufficient or impracticable. The vapor of sulphur alone destroys them, but it communicates a disagreeable odor to the wheat. This evil may be remedied in part, by frequently stirring the grain, by sifting it, and by passing it through an iron riddle, the wires of which must be so close, as to prevent the good grains from passing through, but permit the worm-eaten wheat and weavels to pass, and then fall into vessels of water.

In some provinces they mix millet with the wheat, presuming the weavel prefers that grain. Before using the grain after this mixture, it is separated by a riddle which retains the wheat, but lets the millet and dust pass through its meshes.

The fermentation of grain is but the commencement of vegetation, and an interior motion of the constituent principles of the wheat, which incline to develope themselves, so that in order to preserve the grain, the germination should be restrained, and the interior motion prevented. This is generally accomplished by keeping the wheat, and indeed all the seed of gramina, in a dry and cool place. For this purpose, the wheat is kiln dried, or it may be dried in an oven, by putting it in one immediately after the bread is taken out, and letting it remain until the oven gets cold. Experience has taught us, that the wheat thus prepared, will not germinate; it is consequently unfit for seed. After the wheat has been thus dried, it is to be put in the granaries of preservation, invented by Duhamel. These granaries, which will hold a thousand cubic feet of wheat, consist of a large chest thirteen feet square by six high, placed upon frames. Four

inches from the bottom of the chest a second floor is made of two rows of laths, or slips, that cross each other at right angles, and which is covered with a strong hair cloth; this prevents the wheat from escaping, but gives a free circulation to the air. The top of the chest is covered, to keep the mice and other animals from entering it; in this cover are a few holes which open and shut. Ventilators are placed and kept playing in this machine; they inhale the surrounding air, and by means of an air hole at the bottom of the chest, the air is forcibly introduced between the two bottoms, and passes through the grain so rapidly, as to raise it sometimes a foot high. In passing it carries off any moisture that may be attached to the grain, and escapes by the openings in the covering of the chest.

This garner has the advantage of containing in a small space, a large quantity of wheat, and of preventing its fermenting by heat. A proprietor has simplified this plan, by making in his granary several holes in the wall facing the north; this window, similar to those of lanthorns, only let air enter and not birds; and the air always blows strongly upon the heap of wheat.

The authors of the "Methodical Dictionary of Science," speak of another not less efficacious method. The granary, say they, ought to be well cleaned, to have openings to the east or north, and trap doors above. The wheat that is put into it, should be well dried and cleaned. For the first six months, it should be stirred every fifteen days, and in the succeeding eighteen months, every month. After this period has elapsed, there is no more danger of its



heating. The heaps may be made as large as the floors will permit. Afterwards a layer of quick lime in powder, four inches thick, is spread over the wheat; this lime is to be wet, and thus forms with the grain a crust. The grains at the surface germinate and shoot forth a stalk about a foot and an half high, which winter destroys. By this means they succeeded in the citadel of Metz, in preserving a large quantity of wheat, that the duke of Espernon had brought there, from the year 1570 until the year 1707. The crust which was formed, was so strong that it did not give way when a person walked upon it.

Throughout Africa they preserve grain dry in very deep pits in the midst of rocks, which are constantly dry. The mouth of these caves, called by the Arabs *matamores*, is very small; they enlarge them as they progress; they line the bottom with dry straw, previous to putting the grain into it, when filled they cover them with interwoven wood, upon which they throw sand, and over this they put a cover of earth in a shelving, form four feet thick. In *Ukraine* and in *Lithuanie*, the inhabitants employ a similar method, and lock their wheat in the caves; but they take care not to open them suddenly; they give vent to them by degrees, to prevent the fatal effects of their noxious exhalations.

Wheat is subject to several diseases, the principal of which are, 1. The scab or the rot, otherwise the mildew, which is but one and the same disease, and which consists in the meal being converted, as the grain is formed, into a blackish powder of a fetid and contagious odor; a grain of wheat blackened by this powder, afterwards produces grains of rotten wheat;



but it loses its contagious qualities by becoming old. When it is fresh, and a certain quantity of it is found in the bread, it communicates unhealthy qualities to it; convulsions, pains of the head and belly, diarrhea, &c. have been seen to result from its use. According to the experiments of citizen *Girod Chantrans*, the black powder that characterises the rot, is composed of animalculæ, which multiply in the same manner as the volvox, and which affords a *sui generis* acid, that he has called the acid of mildew, or mildew-ric acid. 2. The rust, which is a yellowish powder, attached to the leaves and sometimes to the stalk of the wheat, and that depends upon a defect of transpiration, occasioned by the thickening of the sap, caused by cold and damp weather.

Wheat may be preserved from these diseases to a certain degree, by washing it in water in which ashes and lime have been infused, previous to sowing it, as has been proved by the experiments of Tillet.

3. Ergot sometimes attacks wheat, but more frequently rye. See what has been said under the article rye.

4. Lastly. The blast, which is known, when instead of finding the head filled with good grains, the extremity is found without them, or if grains, they are small and destitute of meal; this disease is the effect of non-fecundation. When abundant rains fall whilst the wheat is in blossom, all the pollen of the stamina is washed off, and the grain which is left without being fecundated, remains small and without meal. Flashes of lightning also blast wheat. After great storms, Duhamel says, he has observed trees to lose

their leaves, and others die without having been struck by the lightning. Frost, which affects the head or ear, also causes blast.

Wheat is sometimes found mixed with darnel or tares, an annual graminous plant, which communicates injurious qualities to the bread, especially when it is eaten warm. This plant which is not commonly met with, except in ground that is badly prepared, is virulent; it produces intoxication, violent diseases of the head, vertigo, vomiting, pains, drowsiness, and convulsions, which sometimes terminate in paralytic affections. Epidemics and even sudden death has been seen to result from the use of bread which has contained this article. On opening the bodies of persons who have died from this cause, the stomach has been found much contracted. Its inebriating quality is communicated to beer and even to the whiskey, obtained from the wheat which contains it.

This plant can only be extirpated by proper labor and frequent weeding. It is among many nations the emblem of discord, under the name of *Zizanie*.

In order to procure ourselves good bread, and to prevent the accidents owing to the bad qualities of wheat and rye, it is highly necessary to have a good knowledge of both. The distinctive characters of wheat of a good quality are, it should be dry, hard, heavy, thick grained, well nourished, rather round than oval; not to have a very deep groove or furrow, smooth, clear at its surface, and of a bright yellow color; to sound when shook about in the hand, and to give way easily to the arm when introduced into a bag that holds it. But a shorter method of knowing the

quality of wheat, is by its specific weight. The heaviest wheat of an equal quantity, is certainly the best; for even damp wheat does not weigh so heavy, as that which is well dried; the difference is so great, that a pound of good wheat well dried, is to a pound of damp wheat, as two hundred and eighty are to two hundred and forty.

Wheat flour of a good quality ought to be of a citron yellow, dry, granulated, heavy, to stick to the fingers, and when squeezed in the hand, to form a kind of cake, which breaks when the hand is open. To judge with more certainty, it should be kneaded with water, and made into a ball; if the dough, after having been handled, soon hardens in the air, acquires a body, grows longer without dividing, it is a certain sign that the flour is good, as well as the wheat from which it is made.

Good rye ought to be clear, not very long, big, dry, and heavy; its meal well ground and bolted, has not the yellow appearance as that ascribed to wheat; it is a fine white, soft to the touch, and diffuses an odor somewhat similar to that of violets; if it is made into balls with water, it does not become long and tenacious as that of wheat, but on the contrary it is short and fat; it adheres to the wet fingers, and does not soon harden in the air.

SECT. 2. *Of Legumes.* Under the name of legumes, (*legumina*) are included the fruits of *papilionaceous* plants, the capsule of which is called shell, *legume*, their leaves serve as food for beasts, and their grain nourishes man and many species of animals.

The seed of these plants, when perfectly ripe and

dry, are easily reduced into a kind of meal, similar to that of the gramina, but which has a more unctuous softness and a sweeter taste; triturated in water, they render it more milky than the gramina, and when they are whole, they give by means of expression, a high degree of heat and an oily matter. During their germination, a great quantity of the matter of sugar is developed, from which wine might be obtained; their resemblance to the gramina is also marked by the great quantity of feculæ which they contain. Legumes are very nourishing, but not so soluble as the gramina, owing to the oil which they contain. During digestion, much carbonic acid is disengaged from them; for this reason they have always been justly suspected to cause flatulency, and sometimes cholic. *Legumina omnia*, says Hippocrates, *flatuoso sunt, et cruda, et fricta, et macerata, et viridia*, (*Lib. de diæta in acutis.*) In general, legumes are only proper for strong and robust persons, whose stomachs are well constituted. Feeble and delicate persons ought to abstain from their use, as well as those who live an indolent life; to such constitutions, they would be absolutely injurious.

Legumes are eaten in two different states, when they are fresh and when dry. In the first state they have a tender tissue, are easy to digest, and less flatulent, but not so nourishing. When they are thoroughly ripe and dry, they are more nourishing, but less soluble, and give out more carbonic acid.

1. Chick peas, (*cicer sativum*, *Lin.*) an annual leguminous plant, which grows spontaneously in Syria, and in the south of Europe; it is these peas that the Spaniards call *carrancos*, when they roast them, and



which are much used in Africa. This legume is one of the most nourishing plants, but it is very flatulent. Hippocrates considered it as a powerful diuretic; *cicer album per alvum secedit, et per urinam ejicitur, et alit*, (Lib. ii. de diæta.) Its decoction in water is highly spoken of in cases of calculi, but some physicians think its habitual use not exempt from inconveniences, in affections of the bladder.

2. Peas, (*pisum; pisum sativum, Lin.*) an annual leguminous plant of the south of Europe, of which there are several varieties. Peas are not very nourishing, but flatulent, yet less so than beans, as has been observed by Hippocrates. They should be eaten green, and not in a state of ripeness; when green their skin is tender and soluble.

3. Beans, (*faba; vicia faba, Lin.*) a leguminous annual plant, of which there are two principal varieties; the meadow or garden beans, (*faba major vulgaris*) and the small beans, *faba minor*. There are scarcely any difference in them except in size. Beans are eaten green or ripe after being seasoned. Isidorus pretended that they were the first legumes used by man. They are more nourishing than peas but very flatulent: they do not digest easily, and furnish a bad nourishment to persons of a weak stomach; they possess the property of constipating the bowels. Hence they should not be used by those who are habitually constive and subject to a pain in the head and bowels. Green beans are prepared in divers ways, after having stripped them of their shell, to render them more tender. The meal of beans is one of the four resolvent farina. The four are barley, orobi, lupines, and beans. The flowers of beans are distilled, and the water is



used as a cosmetic, proper to soften and cleanse the skin. The Egyptians consider beans as impure, and their priests abstain from them. They were formerly used to give suffrages in public assemblies.

4. French beans, (*phaseoli; phaseolus vulgaris*, *Lin.*) an annual leguminous plant, originally of India; of which there are many varieties. French beans are less nourishing and more flatulent than peas and beans; they digest more easily when well boiled. Their green and herbaceous husks boiled in water, are somewhat similar in their qualities to pot herbs; they are tender and soluble, but not very nutritive. French beans are boiled and eaten green, they are also pickled and dried. When ripe they keep very well in the bush, or shelled, and are not attacked by any insect. They are eaten boiled, prepared in divers ways with or without meat. They make a bad bread, but a good porridge.

To preserve French beans to be used in winter, the most tender and those in which the bean is not formed is chosen: The strings are taken off, they are then put several times in a basin of boiling water to scald them, they are afterwards put in cold water, from which they are taken and left to dry in the shade or near a stove, and afterwards put in a box or paper bags. When we wish to eat them, they must be soaked in warm water, where they swell, and they are fit for use. They have in this state the same color and nearly the same taste as they have when fresh gathered. Instead of drying them, they may be preserved in vinegar, melted butter or oil, but these preparations deprive them of their taste.

5. Lentilles, (*lentes, lens*, *Haller*,) an annual legu-

minous plant, of which there are several varieties, which grow naturally in southern Europe. It appears by the monuments of the ancients, that their philosophers were very fond of lentilles, for Atheneus said that it was a maxim among the Stoics. "That a wise man did every thing well, that he even seasoned his lentilles well."

This legume was much esteemed by the Jewish patriarchs: We know that Esau sold his birth-right for a dish of lentilles. Two substances are distinguished in the lentille, the one cortical, which is astringent and not very nourishing; the other, medullary or pulpos, with which porridge is made, and which is pretty nourishing, and better than the former. In general, lentilles are difficult to digest. Galen considered them as pernicious, and disposed to be converted into an atrabilious substance; he refers in a great measure, the *eliphantiasis*, which was epidemic in Egypt to the use of them.

#### ARTICLE IV.

##### *Of the non-gramina farinaceous Vegetables.*

The principal of these vegetables, which are used for nourishment, are the fruits of the bread tree, pea tree, potatoe, Irish potatoe, casseva, sun flower, dioscoria, iceland moss, sago, and salep.

1. The fruit of the bread tree, called by the Indians *rima*, belongs to a tree that is large and higher than our apple tree, which grows in the Philippine islands, and principally in those of laam and Tenian. The fruit is yellow and nearly as large as a man's

head. Its bark is thick and bard. It is not eaten until it has attained a certain size. In this state it has a taste nearly similar to that of the bottom of an artichoke boiled. When it is completely ripe it has a sweetish taste, which resembles that of a ripe peach; but some pretend that it is injurious in this state, and that it produces dysentery. However, the inhabitants of the country where this tree grows, make the fruit of it their principal nourishment; and they are all large, well made, very robust, tolerably corpulent, and enjoy good health. This fruit ought to be eaten fresh, it cannot be kept longer than twenty-four hours, after this period, it dries, turns sour, and becomes disagreeable, but as a recompense for this, the tree is loaded with fruit eight months of the year.

2. Pea fruit. This fruit belongs to a leguminous tree called pea tree, a species of the *acacia*, which grows spontaneously in Siberia, and in many places of southern Asia. Many of the inhabitants of Siberia, and especially the Tunguese live upon the pea which this tree produces. These peas are easier cooked than ours, are more nourishing, and very oily: It is also said that they are more easily digested. Excellent cakes and bread are made with the meal of these pease.

3. Potatoe, (*convolvus potatus*) a species of convolvulus, the root of which is employed for bread, starch, hair powder, and brandy. This plant is only good in warm countries: It grows naturally between the tropics in Asia, Africa, and America: It is also cultivated in Spain. Its roots, called *apichu* by the Peruvians, are tuberous. Boiled in water or roasted, it has a taste similar to that of the chestnut.

4. Cassave, (*jatropha manioc*) a species of bread is made with the meal which is extracted from the root of a shrub called *manihot*, *magnoc* or *manioc*, *yucca*, *foliis cannabinis*, and which grows in America. The nations who inhabit this continent from Florida to Magellan, cultivate this shrub with care, and prefer the cassave to maize: It is very abundant in their country.

In the Indies and in America, the natives eat the leaves of the *manihot*, cut up and cooked in oil.

The root of the *manihot* is a poison. When prepared it makes a very good bread, the taste of which is superior to that of wheat. The preparation of this root consists in depriving it of a milky juice which possesses an extract that contains the poison. After having dug up the roots, which are pretty similar to turnips, the Indians and savages, whom they serve for nutriment, wash them and peel them, they afterwards rasp and mash them, and then put them in very loose sacks of rushes, under which they hang a very heavy vessel, that receives a juice which its weight expresses from them, and which is thrown away. They dry the farinaceous substance on plates by a fire; it forms into lumps, and is the cassave of which they make a kind of bread. The extract of the expressed milk, which is left to deposit, affords the finest feculæ, which soon dissipates: It is known by the name of *moussake*, and it might be employed as powder, but it would soon burn the hair. Pastes are made with the cassave, with which sugar is mixed; *langon* is also made with it, this preparation consists in soaking the cassave a short time in cold water, and then throwing it in boiling water, the whole is stirred until of the con-



sistence of dough or mush: this is the ordinary nourishment of black slaves; when they are sick, sugar or syrup is added to it.

From the experiments made upon those poisoned by the non-prepared manihot, it results, that this poison remains entirely in the stomach, and that it occasions death without leaving any vestige whatsoever of inflammation, alteration in the viscera, or of coagulation in the blood, although the symptoms to which it gives place are nearly the same as those produced by the acrid and corrosive poisons; which has induced it to be supposed, that this article acts sympathetically upon all the nervous system, whose sensibility it destroys in a few minutes: On opening those who have died from this poison, the stomach is found much contracted. It is pretended that the juice of the *roucou* is an antidote, provided it be taken soon after the poison. Fermin cured a cat poisoned by the manihot, by vomiting it with the warm oil of the wild turnip.

5. *Disocorea*, (*dioscorea sativa*) a species of which grows in America and in Nigritia. The negroes and some savages of the new continent make use of its root. They cut it in slices and roast it in the ashes, or boil it with salt beef. It sometimes serves as bread. Pap is also made with it, which is agreeable to the taste.

6. Irish potatoe, (*solanum tuberosum*, *Lin.*) an ever-green plant, originally of South America, from whence it was introduced into Europe, at the commencement of the seventeenth century. There are several varieties of it. The root which is tuberculous is used; it contains much feculæ, which renders it very nourishing, and which is of the same nature as that obtained



from the meal of the gramina. To obtain the meal, the raw root is rasped, and macerated in water, where it precipitates. A pound of it gives three ounces of a fine feculæ which is white, light, and of an agreeable taste, whether cooked in milk or porridge. An excellent paste is also made with it. Large white potatoes with red spots furnish the greatest quantity of the feculæ. Irish potatoes are valuable for man and animals. Their fresh leaves are very good provision for animals, and their roots roasted in the ashes, or cooked in the steam of boiling water, in covered vessels, or even without water, with or without seasoning, is a very healthy aliment for man. When boiled in water in the open air, they lose a part of their good qualities: When scalded in salt water, and afterwards dried and ground, a bread is made from them for the use of mariners, which is not attacked by insects. Notwithstanding all these advantages, the Irish potatoe contains a narcotic principle, but fire or simple boiling water is sufficient to deprive it of this quality. By distillation it gives a spirituous, acrid, and inebriating liquor. Moreover, it is not the only plant in which a poison is found combined with an aliment: This combination exists in a more remarkable manner in the manihot, as I have said above. The Irish potatoe when dry is easily reduced to a meal, similar to that of the gramina; but it does not, as that of wheat, contain gluten. The potatoe is very soluble, light, of an easy digestion, and slightly acescent. Very good bread is made with it, either from the meal alone, or by mixing its pulp with wheat flour.

The Irish potatoe combines the advantages of a healthy and an abundant nutriment, with that of a

certain crop; it requires but little seasoning, and may be preserved a long time. Hence, their culture cannot be too much recommended. It is, besides, a great resource in times of scarcity of grain.

7. Sun flower, (*helianthus tuberosus*, *Lin.*) an ever-green plant, originally of Brazil, and which was not cultivated in France until the commencement of the seventeenth century. It is only the roots that are used; they are irregular, tuberculous, fleshy, and nourishing; they have a taste similar to that of the artichoke. The whole plant is very good nourishment for beasts. It multiplies greatly, resists the cold, and is almost indestructible.

8. Iceland moss, (*lichen Islandicus*, *Lin.*) We include under the name of mosses, a considerable family of plants, the most of the species of which are small, parasite evergreens, of a membranous consistency, and a greyish color. The Iceland moss is a species, that is used as a medicine and as an aliment; it is bitter and nourishing; many virtues are attributed to it, such as those of an anti-phthisic, anti-hectic, anti-septic, anti-acid, vulnerary, and sometimes a purgative; it is also employed in the scurvy, colds, dropsy, stone, and hydatids of the womb. It is questionable whether it possesses these properties; it should only be considered as a aliment pretty easy to digest, and which possesses a tonic virtue; the Icelanders use it as a nourishment; they boil the moss in water, and obtain a kind of pap from it. Some persons prepare it in milk. When the Icelanders are scarce of meal, they make bread with the powdered moss. It is an excellent forage for horses, cattle, and hogs; it is also used to dye wool yellow.

9. Sago, (*sagusium*) is a kind of vegetable paste made from the feculæ, which is obtained from the pith of some species of farinaceous palm tree, (*cyca circinalis*, *Lin. et sagus*, *Rumph.*) which grows in the Moluccas and southern islands, and from Barneo to Siam. We receive it in grains pretty similar to those of shelled barley; it is boiled in water, with which it forms an insipid and slightly transparent jelly. The gelatinous nature of this substance, indicates its being very nourishing; it is very soluble and digests easily; its use is perfectly suitable to debilitated and exhausted persons, and especially to those laboring under the phthisic; it is used as rice, barley, or vermicilli in soups and milk; in these its volume is considerably augmented, and it forms an aliment, as healthy, as it is agreeable.

10. Salep, (*salap*, *salap turcarum*), is extracted from the bulb of a species of orchis, (*moscula*, *Lin.*) which grows in Persia. It is an insipid feculæ, a small quantity of which is converted into a copious jelly in a large quantity of water. It is very nourishing and very easy to digest. A similar feculæ may be obtained from several other species of the orchis. Retz discovered the means of imitating the salep of the Persians with the root of the orchis of our country. The process consists in removing its extractive principle by decoction, and drying the residue, which by means of the preparation, becomes transparent; to accomplish which, after taking off the skin, the bulb is to be boiled in water during half an hour, and then dried.

In this manner a salep is made from the bulb of our orchis, similar to that from the Persian. It is re-

duced to a jelly by again boiling it. Salep possesses the same virtues as sago; it is, however, slightly astringent.

#### ARTICLE V.

#### *Of Nuts.*

Under the name of nuts, (*nucēs*) we comprehend seed or kernels, covered with a more or less hard envelopment, which contain a certain quantity of mucus and much fixed oil. The oil may be obtained by simple expression or by heat. The first process is preferable, as the fire alters the qualities of the oil. these kernels do not digest easily; they remain a long time in the stomach, and frequently produce uneasiness and indigestion. There are no nations whose inhabitants do not use fixed oil, which proves that they are necessary to the animal system; they furnish, in fact, two principles, hydrogen and carbon, which are useful materials to nutrition.\* All oils have, in general, the same properties and the same action upon the body; none ought to be employed but those that are pure and exempt from rancidness; their use should be interdicted to those subject to acidity, to those who have a weak and relaxed stomach, and to pituitous temperaments. *Oleum et quæcunq̃ue oleosa reficiunt et pituitosa sunt.* Hip. lib. de affect.

#### 1. Almonds, (*amygdalæ, nucēs græcæ; amygdalus*

\* Oil is a fat, unctuous, fluid substance, insoluble in water, and combustible. Oils are distinguished into fatty or fixed oils, and essential or volatile oils. The constituent principles of both are hydrogen and carbon; the latter forms nearly three-fourth of the fixed oils, and hydrogen is the most abundant in volatile oils. Hydrogen and carbon are combined with mucous in fixed oils, and with aroma in the volatile.



*communis*, Lin.) the fruit of the almond tree; a large indigenous tree of Syria and Arabia, which was brought, in the time of Cato, from Greece into Italy. It is now cultivated in the southern and western countries of Europe. There are two principal species of almonds, the sweet and the bitter almond. Sweet almonds give half their weight of oil, and bitter ones only one fourth: the first are sweet and nourishing, but injurious to the stomach; Hippocrates asserts that they are heating.

With almonds and sugar, divers preparations are made; such as *macaroon*, Savoy cakes, pastes, preserves, emulsions, and orgeat are prepared from them. In all these preparations, none but the freshest almonds should be used, for if they are kept too long, they become rancid, and irritate in whatsoever manner they may be used; they should always be stripped of the yellowish pellicle with which they are covered, which contains a resinous and acrid powder that irritates the throat.

Bitter almonds possess different qualities, and their excessive use is not without danger. It has been long since known that they are a fatal poison to many animals; such as foxes, hogs, and the greater part of birds; experience has taught us that they produce inebriety in man.

It is very probable that many of the species of the class of vegetables called *Icosandria*, possess some poisonous property. The flowers of the peach tree, purge *cum molestia*, and a strong dose vomits. The distilled water of the laurel is, manifestly, a poison. Mead, who excelled in the art of making experiments, considered even the water of the common cherries as



doubtful, in consequence of its great resemblance to the laurel, and the English still think it a real poison.

It was formerly thought that the oil of the bitter almond was bitter, and a resolvent, and they were employed internally, but it is now well known that this oil does not differ from that of the sweet almond, and that the bitter principle is only in the extractive part, which does not mix with the oil during expression.

2. Hazel nuts, or filberts, (*avellane*, *nucus pontica*.) They are the fruit of the (*avellana*, *Lin.*) hazel nut bush, which grows throughout Europe, and which are ordinarily, met with in the hedges or in the woods; they are cultivated in gardens and in yards. The fruit of the wild hazel-nut tree is small, and not so pleasant to eat as that of the cultivated. Filberts are farinaceous, oily, sweetish; bread may be made of them. They furnish half their weight of fixed oil, which is as good as that of the almond, and which does not turn rancid so easily; they have a pelicle which envelopes them, and which is astringent and irritating; like that of the almond, it frequently excites a cough in those who eat it; which does not often happen when precaution is taken to remove the skin or covering.

3. Walnuts, (*nucis juglandes*; *juglans regia*, *Lin.*) the fruit of a large tree, originally of Persia and Syria, transplanted into Europe from time immemorial; the handsomest of those are suitable for joiners or cabinet maker's work: there are several varieties of this tree. Walnuts are very oily; they give by expression, half their weight of oil, which is not used in the kitchen, but for other purposes. They are among the number of aliments, but not among those friendly to

the throat and breast; the oil of walnuts soon becomes rancid by drying. Walnuts are used before they are perfectly ripe, and are then called *cerneaux*. In this state they are rather watery and mucilaginous, than oily; as they are difficult to digest and frequently cause indigestion, it is not prudent to eat many of them. Walnuts still tender, are preserved in sugar. From the green shell of the walnut, a ratifia is made, which is supposed to be a good stomachic. The shell or hull, as well as the roots of the tree, are used for a dye. Ripe walnuts may be long preserved in dry places; if they be soaked in water for some days, they become soft, peel better, and are more agreeable to the taste. The flowers of the walnut tree exhale a narcotic aroma; it is dangerous to repose under this tree when it is in bloom.

4. Chestnuts, (*castanea; fagus castanea, Lin.*) the fruit of a large tree of mountainous, warm or temperate countries: there are several varieties of them. The chestnut is farinaceous and sweet; fire develops this taste in a singular manner. Chestnuts may be reduced to meal, and flour may be made from it; and it may be prepared in as many different ways as other meal. The people in divers parts of Savoy and of France; in the Apennine, and in the southern parts of Europe, make it almost their only nourishment. The chestnut contains oil, but it cannot be obtained by expression, because it is in a state of combination. Chestnuts dissolve easily, especially when roasted or boiled, but they are flatulent, although very nourishing. Zenophon relates, that the Greeks, formerly, used chestnuts instead of bread. It is not rare at this day, to see in Italy and the south of France, old per-

sons of ninety or an hundred years, who have lived upon chestnuts, and who have constantly enjoyed perfect health. Chestnuts are eaten raw, roasted, or boiled in water or milk. Dried chestnuts, known by the name of white chestnuts, are prepared in the southern departments of France. Previous to exposing them to the fire, they undergo the first state of germination, which contributes much to give them the sweetness which they possess. We may make a fermented drink from them.

5. *Cocoa*, (*avellana Mexicana*,) the fruit of the cocoa tree, (*theobroma cacao*, L.in.) which is of a considerable height and middle size, peculiar to the new continent, and which grows naturally in the divers countries of the torrid zone in America, and particularly in Mexico. It is very nourishing, and not at all injurious to the stomach, like the other nuts, owing to its oil being much divided and combined with the fculæ, and to its being less subject to rancidness. There are, however, stomachs which do not digest it easily. It is customary to roast the cocoa, and to mix it by trituration with sugar, cinnamon, and vanilla, which aid the digestion of it. It is this preparation which is known by the name of chocolate, and of which there are divers kinds. That species in which vanilla and other aromatics are not used, is called chocolate of health. However, that made with vanilla and cinnamon is preferable, when these articles are not in too great a quantity, as it digests more easily. Chocolate is recommended as a very strengthening medicine to old persons, the pituitous, and to weak and exhausted persons; the faculty of awakening the venereal desires, and of exciting the

passion of love, is attributed to it; it is in general injurious to young persons, as well as to warm, bilious, and nervous constitutions. An oil of the consistence of butter, is extracted from the cacao, called butter of cacao, which unites to the softening virtue of the other oils, the property of not contracting an odor, and of soon drying. The Spanish women use it as a cosmetic, which renders the skin soft and smooth, without communicating any greasy or shining appearance.

6. Cocoa, Indian nut, the cocoa tree, (*palma Indica; coccos nucifera, Lin.*) is a species of the palm tree, the most valuable for its utility; it grows in Africa, Asia, and America; the tree is of a very handsome form, and grows to the height of from forty to sixty feet; its fruit, larger than the head of a man, has a filamentous bark, which covers a hard nut of the size and form of a small melon, and whose pulp furnishes a very healthy nourishment; a very mild oil is obtained from it by expression, which becomes bitter by age. The centre of the nut is filled with clear water, which is cooling and of a sweetish taste. When the fruit is old, this water is dissipated, and gives place to an almond that soon fills all the cavity, and which becomes proper to the germination.

When the point of the flower buds of the cocoa tree are cut previous to their perfect development, a white liquor flows from them, which is very sweet, and from which, by boiling with quick lime, sugar is obtained; it very soon becomes sour, and is converted into a very good vinegar. When distilled during its greatest strength, a very spirituous brandy is obtained from it.



7. Pine nut, (*nuclei pini*) the fruit of the pine, called also *pinpignier*, (*pinus pinea*, *Lin.*) which grows in Spain, Italy, and the southern departments of France. These are the pine apples of the sculptures; their lignous envelopment contains an agreeable almond or kernel, which is emulsive, and furnishes a little more than one-third of its weight of oil. Hippocrates recommended the use of the pine nut in inflammatory affections; it is very nourishing. Some pretend that pine nuts are proper in cases of exhaustion, produced by the pleasures of love, and that they augment the milk and the seminal liquor; these qualities are not peculiar to them; all nourishing aliments, which digest easily, produce the same effects.

8. Pistachia, (*pistacæ nuces*) the fruit of an almond of the pistachia tree, (*pistacia vera*, *Lin.*) a middle sized tree, originally from Asia, whence it was transplanted into the south and west of Europe at an early period. The pistachia contains nearly an eleventh part its bulk of oil; the nuts are very nourishing and agreeable to the taste; they are recommended to fortify the stomach, and to repair the exhausted energies; they are very lenient, and their use is proper in all cases where there is cough, pain, and emaciation.

9. Water chestnut, (*tribulus aquaticus; trapa natans*, *Lin.*) the fruit of an annual plant of ponds, which requires at least twenty inches of water; it grows throughout Europe, except in the northern districts; its qualities are very similar to those of the chestnut. The fruit is acrid and slightly astringent; it is eaten raw or cooked, and constitutes a great part of the nourishment of the inhabitants of Corinthia and



**Limousens.** Bread is also made of it. This fruit ripens under water, and has a disagreeable taste when eaten raw. Boiling deprives it of its acrimony, and gives it a sweet taste. Thompson considers this plant as poisonous.

10. Beech mast, the seed of the beech tree, (*fagus; fagus sylvatica, Lin.*) They have a taste very similar to the filbert, and are very nourishing. In time of scarcity, bread may be made with them. Cornelius of Alexandria, relates that the inhabitants of the isle of Chios lived upon this fruit during a siege. Mortimer says that it is slightly inebriating. Much oil is obtained from the beech mast; it is sweet and improves by age, and is very like that obtained from the hazle nut.

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## CHAPTER IV.

### *On Aliments drawn from the Animal kingdom.*

ANIMALS generally furnish three substance which are distinct in their properties, viz. the gelatin, albumen, and gluten: They are all characterised by the presence of azote, but this principle is contained in different proportions in the different substances. There is a greater quantity of it in the gluten than in the other two substances, and the gelatin contains the smallest portion of it. Gelatin is insoluble in alcohol, soluble in water, and especially in boiling water, with which it forms a jelly in cooling. In the bones it is

combined with a great quantity of the phosphat and carbonat of lime. It is one of the principal constituent parts of the white organs, that is to say, of those that do not possess irritability. When it is oxygenated as in the skin, it assumes the state of a fibrous or membranous tissue. Jelly passes into a state of acidity previously to putrefying.

The albumen differs from the gelatin, in its becoming concrete by the action of heat, or oxygen; in a word, by the fixation of the oxygen: It is soluble by alkalies. It is found more or less condensed or oxygenated, and in a state of tissue in the membranes, tendons, cartilages, or to speak more properly in all the white parts of animals. Lastly, the gluten is insoluble in water at every temperature, soluble in acids, and organised in muscular flesh. It is naturally in a concrete form, and constitutes a part of the blood in which it is contained in the form of dissolved flesh, to be afterwards deposited in the muscles, which should be considered the secretory organs of this substance. Albumen and gluten, contract the putred without previously experiencing the acid fermentation, and each of the three substances give ammonia in putrefying, as well as by distillation. When these animal substances are subjected to the action of nitric acid, azotic gas, and the prussiac acid gas is disengaged, and by this means they are rendered similar to their ancient vegetable state, from which they only appear to differ, as I have already said, by the presence of azote, and sometimes of phosphor, which is in them combined with hydrogen, carbon, and oxygen.

When these animal substances are subjected to distillation, carbonat of ammonia, and oil is obtained.

Bertholet obtained a new acid from them, to which he has given the name of *zoonic acid*; its smell resembles that of flesh much roasted, and its taste is rough.

In addition to these different principles, we also find in the muscles, a mucous extractive substance, soluble in water and in alcohol, which has a distinct taste, and which becomes acrid, bitter, and salt, by concoction. It has a particular odor which heat develops. It is this substance which colors soups and gives them an agreeable taste. Lastly, the action of heat exalts this taste to such a degree as to make it resemble sugar, or boiled sugar: Such is that on the surface of roasted meat, and which is called *rissolee*. This extractive substance, evaporated to dryness, and thrown upon burning coals, swells, liquifies, and exhales a sharp acid odor, similar to that of burnt sugar. Exposed to the air it attracts moisture, and a saline effervescence is formed at its surface. When it is mixed in a certain quantity of water, and exposed to the warm air, it turns sour. All these properties render this substance analogous to soapinicious extracts, and to the matter of sugar of vegetables.

As to the salt which chrysalises in the slow evaporation of the decoction of flesh, its nature is not yet well known. Thouvenel, from whom this analysis is taken, obtained it in the form of down or badly formed chrysalis. He thinks that it is a perfect neutral salt, formed by the union of the potash, and of an acid which has the character of the phosphoric in phytivorous quadrupeds, and that of the muriatic in carnivorous reptiles. These salts manifest their presence even without excess of acid, in soups as well as in wine, by means of lime water and ammonia, which

forms white precipitates, and by a solution of the nitrat of mercury, which gives in soups a red precipitate.

The muscles also contain in the parenchymatous and cellular substance different humors, of which some are concrete, and others in a liquid state. These humors are, 1. A red and white lymph; 2. Gelatin; 3. Lastly, a fixed oil of the nature of fat. The first is perfectly similar to the lymph of the blood, that is to say to the albumen, it is this which coagulating by the heat of the water in which meat is boiled to make soup, produces a scum, that is removed and which is a brownish red salt, owing to its being altered by the heat. It is the jelly or gelatin of the flesh, which communicates to soup, prepared from the flesh, of young animals, a trembling mass; young meat contains much more of this substance than that of old animals. Lastly, the fatty substance, which forms these round and fat drops, swimming at the surface of soups, and which congeal by cooling, presents all the characters of fat.

Animal flesh is much more nourishing than vegetable aliment; it repairs and supports the energies better, and in this respect it appears to be analagous to the nature of man. However, its excessive use, or habitual animal nourishment, without a mixture of vegetables, produces real inconveniences; it makes too much blood, and augments the nature and tendency of the humoral system to putrefaction, especially when the vital energies have not force to oppose the septic power of this aliment. Nevertheless, persons in whom the vital energies are intense, have less to fear from the use of this aliment. But it is generally ad-

vantageous to observe a mixed regimen, and always to use vegetable and animal substances. Besides, the excessive use of meat, and especially that which is raw or not sufficiently cooked, causes, as I have already said, a ferocious character, which produces pride, hatred, contempt, indocility, and other sentiments which deprave man, and cause him to detest his fellow beings.

## ARTICLE I.

*Of Milk.*

Milk is the first aliment of man, and of the greater part of animals; it is the most proper in early life, and especially that of the mother; it is an animal emulsion, a white liquor of a sweet taste, which consists of three distinct parts, to wit: the serum or whey, cheese, and the butter. The serum is the vehicle of the other two substances; it contains a sweet substance, called sugar of milk, and which is, as it were, a sugar in its forming state. It also contains phosphat of lime, which is more abundant in it, under similar circumstances, than in any other animal humor. It is the phosphat of lime which forms the basis of the bones, this is the reason why nature has placed it so abundantly in milk, for the growth and development of the bones, in the first period of life. Cheese is a true albumen, and butter a concrete fixed oil, the concretion of which, and the separation from the other parts of the milk by simple motion, are owing to the absorption and fixation of the oxygen of the atmosphere, during the formation of cream.

The proportions of serum, cheese, and butter, are



nearly the same in the milk of the cow and that of the goat; the latter, however, contains a little more cheese than the former, and the former a little more butter than the latter. The milk of the goat has a twelfth or thirteenth more of the sugar of milk than that of the cow.

Their properties are nearly the same; however, that of the goat is not so relaxing, and is a greater tonic; it sometimes, nevertheless, passes off slowly, and even constipates the bowels. The milk of sheep contains a fourth more of cheese, twice as much butter, and a third less sugar; its cheese is more tenacious, and consequently the milk not so easy to digest; that of the ass contains a third more of the sugar of milk, than that of the cow, and but very little cream, from which butter can be made. Spielmann was able to obtain from a pound of ass's milk, but a drachm and an half of cheese, which was very nice. These three substances separate spontaneously by standing, but no coagulum can separate this milk, which is not so fat and rich in cheese as that of women. Spielmann obtained from two pounds of woman's milk, an ounce and an half of cream, which gave him six drachms of butter, and half an ounce of very agreeable cheese. Mare's milk has the greatest affinity with ass's; but what is very important to remark, is, that the variable proportions, as well as the medical properties of milk, are owing to the actual state of the animal, to the nature of the aliments with which it is nourished, and to the passions it experiences.

Milk is an aliment adapted to the digestive forces of the new born child; it is the most proper for it in

consequence of the facility with which it is digested; that of the mother is the most proper, and no other can substitute it. In fact, the best nourishment for a child, is that even with which it commences its existence, and to which nature has given gradually the most proper preparation for its state and for the development of its organs. Suckling has its limits, and it is as improper to suckle a child too short a time as too long. In general, suckling should not be continued for less than seven months, nor more than twelve or fifteen, and the custom of not giving the breast more than nine months, is founded upon experience and observation. Suckling continued beyond a year or fifteen months, promotes or augments a disposition to the rickets, especially when dentition is performed slowly and with difficulty. It is not proper to give to children, during the three or four first months of life, any other nourishment than milk. It is not until the end of this period, that other aliments should be added; and when they are, the quantity of them should be gradually augmented, until the period of weaning. In this manner one is not obliged to make great changes, and it is a real advantage, seeing that never take place without occasioning obvious and sometimes fatal derangements.

There are signs by which we know the good and bad qualities of milk. Galen judged it by the taste, smell, and appearance; he supposed that to be good which was of a sweet taste and without odor, or of an agreeable smell; he required it to be white, regular, and of a tolerable consistence; it ought to be such, that when one takes a small drop of it, it preserves its round form without running, he considered that as

pernicious which was too thick or too thin, irregular, and especially that of which the taste was either bitter or salt. Primerose tried it by imbibing it in a white linen, which he afterwards dried; and proscribed with reason, that which communicated to the linen any color whatever, other than that which is natural to milk.

When the milk does not possess the proper qualities, it digests badly, and occasions acidity, cholic, diarrhea, convulsions, mesenteric obstructions, hectic, &c.; when the bad qualities of the milk cannot be corrected by the regimen of the nurse, it is necessary to choose another. Acidity and the other affections of which I have just spoken, are also frequently owing to the excessive use of vegetables, soups, and sometimes to the extreme weakness of the digestive organs. In the first case, the nourishment of the child should be changed; in the second, which is ordinarily designated by the milks coagulating, which may be discovered by salts, it is proper to give the child some gentle tonics, and especially the watery infusion of rhubarb. Absorbent earth has been recommended by many physicians, as an efficacious means in the acidities to which children are subject; but experience and observation have not justified this practice; on the contrary, they have taught us that the use of these substances augments, most frequently, the disease, and gives place to more serious accidents.

The milk of ruminating animals, which contains the most cheese, may supply the use of that of the mother to a certain degree, but it is never so advantageous. It is only in cases where the child cannot be nourished without being exposed to dangers, or where the

milk is not proper for it, which is rarely the case, that it should be weaned. In these circumstances, I prefer the milk of animals to that of a mercenary nurse. There are too many risks to be encountered with the most of these women, who are compelled by a sordid interest, or want, to renounce the quality of a mother; to say nothing of the pernicious passions, to which many of them are slaves, and of their bad conduct, a want of care, and many other similar causes, which have a great influence upon the children whom they nurse. How many women are there not, who transmit with their milk the diseases and vices with which they are infected, and who entail on the child a painful and miserable existence, if death does not relieve it from them in the first age?

Milk is a salutary aliment, prepared by the hands of nature, and as it were, half digested. It is useful, especially to persons whose digestive organs are very weak, as well as in all cases of exhaustion, in most cases of phthisic, cough, and of marasma. A disposition to these diseases, and the progress of them has been arrested, by the use of milk alone as diet, combined with proper exercise, and that which is proportioned to the strength of the patient. There are, however, cases where this aliment is not proper in the same diseases, as has been already well observed by Hippocrates: "To give milk to those affected with headache is improper; nor is it adapted to the feverish, flatulent, and thirsty; nor does it suit the bilious diarrhea which occurs in acute fevers, where a great quantity of blood is evacuated. But it is proper for the consumptive, who have but little fever, and it is salutary in slow low fevers continued beyond their ordi-



nary period, when not contraindicated by any of the preceding symptoms." (Aph. lxiv. sect. 5.)

Milk is improper in most of the cases mentioned in this aphorism, because they are produced by or accompanied with the presence of gastric or intestinal *sabura*. Consequently, this substance by altering the milk, augments the focus of irritation and corruption, and the diseases are aggravated; for this reason Hippocrates also says: "The more food that is given when the humors are unconcocted, the greater is the injury committed." (Aph. x. sect. 2.)

Milk is not proper, according to Hippocrates, for very thin persons, because the digestive juices have not a sufficient energy, and the powers of the stomach are insufficient to digest it; whence it results that it acquires pernicious qualities, and that it gives place to *nidorous* or acid *subura*, cholics, and diarrhea, which shorten their lives. A high fever also renders the use of milk improper, because the labor of digestion cannot be properly performed, in this case, the milk is badly digested and becomes a new morbid stimulus.

The best manner of taking milk in the cases of which I have just spoken, is of sucking the animal, or of drinking the milk just as it comes from the udder, or of warming it to the degree of heat proper when first milked. The two first are preferable, because the milk then retains its *aroma*, and is much the most restorative. It should never be boiled, for it is then much more difficult to digest, and it loses its *aura*.

The nourishment and constitution of the animal which furnishes the milk, are not objects of indifference. They have the greatest influence upon its qualities, and merit the first attention. The milk of cows when



in æstrum coagulates with difficulty. There are also many vegetables, which when eaten to a certain quantity, changes the nature of their milk, and of its constituent parts. The shells of peas, especially, produce this effect. Milk preserves the color, odor, taste, and the most of the other properties of the aliments with which the animal is nourished. Saffron gives it a yellow, and madder a red color.

Thyme communicates its odor to it, garlic its taste, absynthia renders it bitter, &c. It would then be desirable that the animal should only use plants which are proper in the species of disease for the use of which milk is employed. There is no doubt but that from attending to these principles, we should succeed more certainly in curing and preventing diseases, to which we ordinarily only oppose feeble arms, because these precautions are not taken in the use of it.

The constitution of the animal should be strong and robust, it should be of a suitable age, and in good health. The milk of young animals is too thin, and that of old ones too thick. The milk of an animal in æstrum is not good, nor is that of an animal near the term of delivery, or which has just calved. The milk is better in the month of May, and during summer than it is in winter. In the latter season it is too thick.

Although milk is generally a very salutary aliment, its use would be very injurious to strong and robust men: or to those who are habitually engaged in laborious work. It would be insufficient to support the energies of these, and would soon throw them into a state of debility, and produce a pernicious exhaustion. There are also persons who do not digest milk, or digest

it badly, and to whom it is consequently injurious: In the first case it produces constipation, and in the second a sense of heaviness in the stomach, cholic, and purging. To guard against the constipation, the use of mild laxatives or injections have been recommended; and to avoid its producing pains and diarrhea, the addition of water and the use of gentle tonics have been advised. In the latter case, I have seen good effects from the use of powdered rhubarb, which I prescribed in doses of from five to six grains, once or twice per day, before taking the milk. When these means are ineffectual and the milk will not digest easily, it is absolutely necessary to abandon the use of it.

Butter possesses the same qualities as the other fixed oils. It is nourishing, but like these it is not easily digested in weak stomachs. The habitual use of butter relaxes the *primæ viæ*, throws them into atony, and promotes abdominal hernias. Butter, as well as the fixed oils, turns rancid by age, and becomes bitter, *bilescit*. In this state it should be rejected from use. Cream is only butter mixed with a certain quantity of cheese. It is more easily digested than butter; but it sours in stomachs which abounds in acids, and it may then produce very serious accidents.

The caseous substance, or cheese, is the principal nutritive part of milk; it is very analogous to gluten, of which it possesses nearly all the properties. Cheese made with milk deprived of its cream, is very nourishing, but not very soluble in the gastric juice. It is only proper for robust persons. It is a strong and healthy aliment but not nourishing. *Caseus robustus est at æstuosus et alit*, (*Hipp. de. deat. lib. ii.*) That

which is made with the entire milk, is not less nourishing, and it is more easily digested; it is still more so when the cream is added, for the particles of the latter, interposed between those of the cheese, diminishes its cohesion. That made of cream alone is not so nourishing, but digests easily.

Cheese is used not only when it is fresh, but also when it has undergone some degree of putred fermentation. In this last state, it is more or less acrid and stimulant, according to the degree of putrefaction which it has experienced. When this is advanced, it promotes the development of the germs which certain insects have deposited in it. Some persons roast the cheese previous to eating it, but this process renders it more difficult to digest. In general cheese should only be used in small quantities.

*Caseus ille bonus, quam dat avara manus.*

In this manner it aids digestion by its putrefactive quality, or rather, by its promoting the dissolution of the aliments in the gastric juice. Cheese that is too old communicates in the *primæ viæ* the leaven of putredity: those that are too much pressed convert the aliment into acidity. Those made of sheep and goat milk digest more easily than those made of cows.

Jonches, (*white cheese*) and the cheese of *Roquefort* are made with sheep's milk. Those made of milk which has not been boiled are the best. Lastly, the cheese of new cream is cooling and digests easily.

Serum or whey is the least nourishing part of milk; besides its sugar which appears to be the basis of the *lactic*, *sacho-lactic* and acetous acids, which modern chemists have obtained from whey, and some salts

which it also holds in solution, it contains a portion of butter and cheese, which may be separated by clarifying it with the white of an egg or fish glue. It is only used as a medicine, and not as an aliment.

The Tartars and Calmucs, from time immemorial have used a wine and a species of very strong brandy, which they obtain from the milk of the mare, by means of simple agitation, which is sufficient to make the milk pass through the vinous fermentation. Nicholas Oseretskowsky, of St. Petersburg, has made many experiments upon this subject of which the principal results are: 1. Skimmed milk does not undergo the vinous fermentation neither alone, nor with a ferment; 2. That milk agitated in close vessels contracts this fermentation and is converted into wine; 3. Lastly, that milk fermented by the effect of heat loses its alcohol, and is changed into vinegar.

#### ARTICLE 11.

##### *Of Quadrupeds.*

The digestive quality of viands, as well as that of vegetables, is in proportion to their solubility in the gastric juice; for in order that the digestion or concoction of aliments may be performed in the stomach, it is necessary that they should be first dissolved in this juice, as is proved by the experiments of Spallanzani. Afterwards a fermentation takes place, which may be designated by the name of animal fermentation, that is performed without sensibly augmenting the heat and without tumult, and which is aided by the vital influence, the irradiation of which converges from every part of the system towards the stomach, to



impart to the alimentary substances, the first character of *animality*.

The dissolving power of this juice varies in different species of animals: it differs in the individuals of the same species according to their age, their constitution, the seasons, the different states in which the system is, and according to the specific qualities of the aliments which they use.

The solubility of the aliments is an inverse proportion to the solidity and tenacity of their tissue, and the degree of tenacity varies in the animal species, from the following causes.

1. Climate has the greatest influence upon the qualities of the flesh of animals. In warm countries, it is more compact and dryer, and the humors are more concentrated and more alkaliescent; it has been observed that the bones of animals which live in these countries, are more dense and heavy than in other climates. It thence results, that the meat in warm countries is, under similar circumstances nourishing, but heavy, not of so easy a digestion, and tend to putrefy. It is not the same in northern countries, which are always cold and damp; in these situations meat is very soft, pituitous, contains badly elaborated juices, and is, consequently, acedent, indigestible and unhealthy. It is only in temperate climates that animal flesh affords man a nourishment exempt from these inconveniences. From what has just been said, we may easily conceive what must be the influence of the seasons upon the flesh of animals; it is necessary, however, to observe that this influence, which is only temporary, is not so great as that of the climate which is permanent.



2. **Nourishment.** In general the flesh of carnivorous animals is more dense, more compact, and more alkalescent than that of the phytivorous; this is no doubt the reason which has determined man to give the preference to the meat of phytivorous animals. We might suppose that this difference of density, depends solely upon the nature of the aliments, which these animals take, and consequently, that those which live upon vegetables and animal substances, ought to have more dense flesh, than those which live upon vegetables alone. But we do not observe these results exactly, for the flesh of the ox is more dense, and more compact, than that of the dog. Moreover, this density varies among the phytivorous animals, and we remark that the flesh of the ox, under similar circumstances, is more dense than that of the sheep. We also observe that the less an animal eats, the dryer its flesh is, and that those which drink much are not so dry as those which drink but little. Consequently, there is an obvious difference between the flesh of animals that live upon green herbs, and those that live upon dry provender. *Sicciora sunt, quæ feno ad pastum utuntur; iis quæ herbis, (de ære, aquis et locis, Hipp.)*

3. *Motion and rest*, are two powerful causes which contribute much to render the flesh more or less dense, and more or less alkalescent or mucous. There is a remarkable difference between the hog and the wild boar, which are nevertheless of the same species. Exercise being a strong action of all the body, which operates equally upon the solids and fluids; when it is habitual, a precipitate nutrition, an anticipated rigidity, and a premature old age should result from it.

Hence, we remark that animals that are made to work too young, never acquire their ordinary growth, that they remain small, and that their flesh is harder and more compact, than that of animals, which have only begun to work, when they have completed their growth. “The flesh of these animals which are much exercised and are full of blood, is more dense than that of those which are not, and particularly the interior of the latter is the most tender. The fibres of the flesh of wild animals is dryer than those of the tame, and those that feed in the woods and fields have dryer fibres, than those that feed at home, for by labor, exposure, and cold, their fibres become rigid.”—(Hipp. de diætâ, lib. ii.) The parts the most exercised, have also the greatest degree of density. The wings of birds are more compact and stronger than the other parts, and those that fly, much more so, than animals of the same species, whose wings have been cut. In general it may be established as a principle, founded upon observation, that wild beasts, those that run in the woods and fields, and which are incessantly exposed to the vicissitudes of heat and cold, have a more compact and more solid flesh than domestic animals. *Fera animalia mansuetis sicciora, et eaque in silvis et agris pascuntur, iis quæ domi nutriuntur sunt sicciora laborando a sole et frigore siccantur.*—Hipp. Lastly, the alkalescency, or rather the *azotization* of the flesh, is in a direct proportion to the exercise, and their mucosity in an inverse proportion. *Azotization* is naturally augmented by the activity of the respiration and of the circulation, which causes the azote to predominate. Idleness and rest produces different effects. The flesh of domestic ani-

mals is soft, tender, fat, and soluble, but does not taste nor smell so strong, as that of game and exercised animals; it is less alkalescent, and its mucilage more or less attenuated or gross, according to the aliments which they eat.

4. *Age.* The younger the animal is, the more tender is its flesh; its density augments in proportion to the progress of life. In general, the flesh of young animals is much more tender and more soluble than that of old. There are, however, stomachs of such an *idiosyncrasy*, that they digest with greater difficulty the flesh of young animals than that of old; such are those disposed to acidity. The same stomach, on the contrary, easily digests aliments, which have a strong disposition to alkalescency, and for which nature inspires them with a taste, because these aliments do not contract acidity, but in some degree neutralize the tendency, which the gastric juices have to become acid.

5. *Sex.* The flesh of animals while young, does not present any difference in the different sexes, but as they grow older one is manifest. In general, the female animals participate more of the constitution of youth, and their flesh continues through the different periods of life, more mucous and softer than that of males; the fibres of these become much harder and tougher as they grow old; thence, all other circumstances being similar, the flesh of the female animal is more tender and soluble than that of the male.

6. *Castration.* Males deprived of the organs which secrete the semen, are neither so strong nor so robust as those which are not; they preserve the softness and laxity of youth, and are more mucilaginous. We

may easily conceive the reason of this, from referring to what I have said, in speaking of the age of puberty, of the influence which the testicles have upon the pulmonary system. Upon this cause depends the great difference that exists between the ox and the bull, the wether and the ram. In the castrated animals, there is a diffusion of fat throughout the system, in the membranes of the muscles and of the viscera, in a word, in all the cellular tissue, from which results a softness and a pliancy in the fibres, which renders the flesh more tender and soluble, than that of animals which have not been castrated.

7. *Fat and lean.* In lean animals the fibres are dry and contracted, and the tissue which they form, is hard and tough; in those that are tolerably fat, they are separated by a loose cellular tissue and by fat, which renders them extremely soluble. However, the flesh of fat animals sometimes digests with difficulty; this ought always necessarily to be the case, when the fat is conglomerated, that is to say, collected in a mass, in the interstices of fleshy fibres; this great quantity of collected fat dissolves with difficulty.

8. *Putrefaction.* The solubility of meat is greater in proportion, as it has been more or less altered by an intestine motion, which diminishes and destroys the coherence of the parts; this is the reason the flesh of the animals recently killed is not so soluble as that of animals which have been dead for some time. However, when the putrefaction has reached a certain point, the meat is pernicious to the animal economy. There are stomachs which reject meat that has experienced the slightest degree of putrefaction. There are others, which, similar to those of animals, digest it



more easily, and which appear desirous of that which has undergone a high degree of decomposition. It appears astonishing, that those who make habitual use of this alkalescent substance, do not experience the effects of putrefaction; but the gastric juice possesses, in an eminent degree, an anti-septic virtue, for pieces of putred flesh put in this juice, cease to putrefy, and their putrefaction seems even to retrograde. However, this anti-septic power has limits, and after some time, carnivorous men become affected with putred diseases and decline.

9. The different parts of the same animal are not equally soluble; those which are united to a loose and soft cellular tissue, as the intestines, tongue, lungs, &c. dissolve easily; those of which the tissue is hard, contracted, and compact, as the membranes, ligaments, tendons, &c. are tough and but slightly soluble. As to the blood, which, excepting the milk, is the only fluid used as an aliment; I think, with Hippocrates, Galen, and Paul d'Egine, that it is difficult to digest, owing to its soon coagulating, and the cooking hardens the coagulum. In addition to this, the blood frequently communicates a disagreeable impression to the stomach, and produces nausea and vomiting. The blood of the bull produces effects similar to those of poisons. It is said that Lucretius the poet, lost his senses from having swallowed the blood, which his wife made him take, in order to make him fonder of her.

We might also consider aliments relative to their perspirable property; but this subject is still in its infant state, and requires to be examined, and to be submitted to new experiments, for Sanctorious and Gor-



ter did not always obtain the same results from the experiments that they instituted upon this subject, which is not astonishing, considering the great number of circumstances, that vary the nature and quantity of the perspirable humor, and which render the examination of the perspirable property of aliments very difficult; such are, among others, the variable nature of the vital energies, the passions, state of the atmosphere, &c. However, we may be certain, from the experiments of Sanctorious, that in general the aliments drawn from the animal kingdom, are more perspirable than vegetable substances. It appears probable, that the excretory substances are composed of the most alkalescent parts of the body. The most alkalescent aliments furnish, other circumstances similar, the greatest quantity of excremental humors; and such is, perhaps, the reason why animal flesh, which contains the most gluten, is also that which causes the greatest degree of transpiration.

There are two species of quadrupeds, the one is in a domestic state, and the other, not susceptible of being tamed, live free in the forests, bushes, meadows, and upon mountains, and avoid men. I will consider both in an alimentary view.

SECT. 1. *Domestic Quadrupeds.* Domestic animals are those of which man has rendered himself master, and which are subservient to his wants. The flesh of these animals possesses qualities very different from that of wild beasts, because their regimen is different; they live in idleness, have an abundant nourishment, which is easily obtained, and are less subject to the vicissitudes of the seasons, and the intemperance of the air; hence it results that they be-

come very fat, that their flesh, which is not hardened by laborious and assiduous exercise, produced by want, is soft and tender; and that their humors have not that acrid and irritating quality, which is found in those of animals that habitually exercise themselves, or which are forced to do excessive labor; and it is remarked that fat animals have a mild and less active bile than others.

1. The ox, (*bos; bos taurus, Lin.*) a ruminating quadruped. This animal appears to be an original of the temperate climates of Europe. The flesh of the ox is very nourishing, owing to its containing much blood; and as Hippocrates has already well observed, the more blood an animal contains, the more nutritive matter does it possess; it is also more dense than that of other quadrupeds in a domestic state; when it is mixed with fat, it is more sapid and more soluble in the gastric juice; it also abounds more in gluten and in albumen, than that of the cow and veal. The meat of veal is more tender, lighter, and digests more easily; it contains more gelatin, has a greater affinity to the aliments drawn from the vegetable kingdom, than that of the ox, and is consequently less nourishing. The meat of the ox constipates the bowels; all its qualities are contained in a few words, in the following passage of Hippocrates: "The flesh of the ox is a strong diet, binding, heavy to digest. Hence, animals which are fat and have much blood, afford a heavy meat; although, they afford blood and milk."

Soups are prepared from beef, which, to be wholesome, ought not to contain too much of the animal juices nor fat. Jelly broths are difficult to digest. The flesh of the ox is eaten boiled, roasted, and in

ragout. In Ireland, England, Holland, and in the north, they salt and smoke immense quantities of beef for the use of the mariners.

The ox is of a great advantage to man; besides the nourishment it affords, and the many advantages that the arts derive from different parts of this animal, it is the support of agriculture, and consequently the principal wealth of states. Tacitus says, the ox was in such veneration among the Germans, as to induce them to give their daughters one as a dowry. The Athenians, who used the oxen in their labors, and ploughed with them, remained a long time without immolating them in their sacrifices. Ælian relates that Phyrge was condemned to death, for having killed an ox that worked at the plough.

2. Sheep, (*vervex*; *ovis aries*, *Lin.*) a ruminating quadruped; it is a native of Asia. This animal, as Buffon well remarks, owes its existence to the protection which man has granted it. It appears, however, that nature did not produce them so feeble, as they are in our day, but that they have degenerated. The primitive stock are recognised in the *Moufflon*. Sheep always furnish man wherewith to eat and clothe himself, independent of a great many advantages that he draws from the fat or suet, skin, entrails, bones, and even from the dung.

The flesh of the sheep is dense, but less so than that of the ox; it augments the transpiration more than other meats, as has been observed by Sanctorius. There is a remarkable circumstance relative to this animal, which is, that its flesh is more sapid and digests more easily when it has arrived at a certain age, than when it is younger. A sheep five years old,

is at its best for eating; beyond this period its density augments, and its flesh is not so easily digested.

Sheep which are kept in dry high places, where an abundance of wild thyme and other odoriferous herbs grow, furnish the best meat; it is not so good when they live in low plains and wet valleys, unless the plains are sandy and adjacent to the sea; in this case, all the herbs are salt, which contributes much to give an excellent taste to the flesh of sheep.

The milk of sheep is, in these places, also more abundant and better tasted. Nothing is more agreeable to the appetite of this animal, nor more salutary, than salt, when given to it in moderate quantities. It is also customary to feed sheep upon grain and legumes, some time before sending them to the butchers. The flesh of the ram is tough and somewhat nauseous, like that of the buck; that of the ewe is viscous and insipid; that of the lamb digests pretty easily. The lamb that has sucked for six months, has a more nourishing and more soluble flesh than that of two months, which is commonly the age of butchering lambs. The lamb is the symbol of mildness, the wether that of a stupid and servile imitation, and the ram, chief of the flock, has been placed among the signs of the zodiac; it is it which opens the spring. Sheep were the subject of the first impression of money; the word *pecunia* is derived from *pecus*.

3. Goat, (*capra*; *capra hircus*, *Lin.*) a ruminating animal, female of the buck, which was originally from the Levant. The flesh of the goat and of the buck, is harder and less soluble than that of the ewe and wether; that of the kid is easy to digest, and is a good aliment. (See Hipp. *de vict. rat. in acut.*) As goats

brouze upon astringent plants, it thence results, that their milk is a tonic and astringent. For this reason its use is very salutary in consumptive diseases accompanied with colliquative diarrhea. When we use the milk of the goat, it is essential to preserve it from brouzing upon milk thistle, the juice of which is acrid and caustic, and of which they are very fond. A delicious cheese is made with goat's milk.

3. Hog, (*sus*, *porcus*; *sus scrofa*, *Lin.*) a domestic quadruped, the origin of which is the wild boar. It was originally from the old continent, and did not exist in the new when it was discovered. The Spaniards transported it there, as well as to all the large islands of America. This animal is not particularly affected by climate, except in cold countries where the wild boar in a domestic state, degenerates more than it does in warm countries; the least degree of temperature is sufficient to change its color. Hogs are generally white in the southern departments of France and even in the province formerly called *Vivaraïs*; whereas in the *Dauphine*, which is very contiguous, they are entirely black.

It is peculiar to the hog, to fatten in a short time, and in a much greater proportion than the other animals that are used by man for nourishment. Another singularity relative to this animal is, that its fat differs from almost all the other quadrupeds, not only in its consistency and qualities, but also in the part of the body which it occupies. The fat in animals such as the dog, the horse, &c. which have no suet nor tallow, is mixed equally with the flesh; and the suet in the ram, buck, &c. is only found at the superficies of the flesh: But the fat of the hog is neither mixed with the



flesh, nor collected at the superficies; as in the *cetacia* it covers it all over, and forms a thick layer between the flesh and the skin.

The flesh of the hog is a strong and nourishing aliment. Its use diminishes transpiration as has been observed by Sanctorious. It is not proper for persons who have indolent stomachs, nor for the inhabitants of warm countries. The young hog is still more difficult to digest. "The flesh of the pig is more difficult to digest than that of the hog, and is sooner evacuated, (Hipp. ii. de diæta.) But the flesh of the pig is injurious when rare or burnt, and is productive of irritation in the *primæ viæ*, exciting diarrhea and vomiting." The young hog, however, contains but a small quantity of fat, but it contains a large quantity of viscous and heavy jelly. The flesh of pork, as Galen, after Hippocrates, remarks, is a nourishment the most proper for strong and robust men, and those habituated to violent and laborious exercise. The *athletia*, who exercised themselves daily at wrestling, in the olympic games, made habitual use of the meat of hogs, and when they quit the use of this regimen for some time, they perceived a sensible diminution of strength, and were less calculated to combat. Hippocrates considered the meat of the hog, which was neither too old, too lean, nor too fat, as the best of meat: *Suillæ autem carnes optimæ sunt omnium carniûm: Sed præstant etiam ex h'is quæ non vehementer pingues sunt, neque tenues, neque veteris victimæ ætatem habent, (de. vict. rat. in acut.)* This nourishment is not proper for debilitated, exhausted persons, and those who lead a sedentary life. "The flesh of hogs is proper for those who are strong and of a good habit,

who labor and take exercise, but too strong for the weak and delicate." (Lib. de affection.) It is not only the flesh of hog which is used, but also that of the fat under the skin, and the fat of the epiploon or caul, called lard; these are used either fresh or salted. Other meats are seasoned with it. The blood and intestines of the hog are also eaten. Sennert has observed that the preparations of the hog, produce in some persons affections of the ears, and especially pains from which they are relieved only by declining the use of it.

SECT. 2. *Wild quadrupeds.* Wild quadrupeds are those that live a free and active life, which refuse all commerce with man, and prefer the state of independence to the abundance attached to a domesticated life. The exercise which they are compelled to take in order to procure nourishment, their restless life, incessantly disturbed by dread, the vicissitudes of the seasons, and the intemperance of the air which they always experience, hardens their flesh, renders their members stronger and more compact, and the humors denser and more concentrated, but at the same time more acrid and irritating. These animals have no fat, or but very little; those that live upon the mountains, as Galen has already said, are dryer, and have harder flesh, but are much more sapid than those of valleys. The flesh of wild animals is less excrementitious than that of domestic ones: it has also a more exquisite taste, and although firmer is, nevertheless, soluble and digests pretty easily.

Wild animals are not generally cooked until some days after they are killed; they soon become tender by putrefaction, but this must not pass certain limits,

lest it should introduce a principle of septicity into the system, and give place to fatal diseases. In general the flesh of wild animals is very nourishing, and lighter than that of domestic animals. *Sed et ferinæ carnes mansuetis leviores sunt, eo quod fructum non similem edunt,* (Hipp. lib. de affect.) Wild animals abound more in gluten than tame ones do, hence their meat is called *black*, to distinguish them from those in which the gelatin superabounds, and which are called *white meats*; such are those of veal, chickens, hens, turkeys, &c. We easily conceive that the first, being more *animalized* than the others, are also much more putrescent. The white meats make much less blood, and are less irritating, and not so heating.

1. Wild boar, (*aper; sus scrofa aper, Lin.*) a wild quadruped, the origin of hogs. Its flesh is more easy to digest than the tame, and has an exquisite taste: *Sus silvestris caro siccatur et robur exhibet ac secedit,* (Hipp. lib. de diæta.) When this animal is in œstrum, it is necessary to remove the testicles the moment it is killed; otherwise all the flesh will receive in a very short time, a strong nauseous odor, which will render it unfit to be eaten.

2. Roe-buck, (*capreolus; cervus capreolus, Lin.*) a ruminating quadruped of the forests and mountains, whose flesh is very delicious. The meat is alkalescent, in consequence of the great quantity of gluten which it contains. Its quality depends much upon the country which the buck inhabits, and in the best countries it is not always found good. Brown roe-bucks have finer flesh than the red ones, all the male roe-bucks which are more than two years old, and which are called old bucks, are hard and of a bad taste:

The doe although older, has a more tender flesh: that of the very young fawn is flabby, but it is delicious when they are twelve or eighteen months old. The roe-bucks of plains and valleys are not good, those of wet lands still less so; those raised in parks have but little taste; lastly, there are no good roe-bucks except those of dry and high countries, intercepted by hills, woods, cultivated lands, and untilled ground, where they have as much air, room, nourishment, and even solitude as they want; for those that are frequently disturbed are lean, and those that have been hunted, as Buffon observes, have an insipid and dry flesh.

3. Goat, (*cervus; cervus nobilis, Lin.*) a ruminating quadruped; an inhabitant of the woods. Its flesh is hard and difficultly soluble, when it is old, as has been remarked by Hippocrates and Galen, it even exhales a disagreeable odor; but the flesh of the hind and of the kid are tender, sapid, and nourishing, especially when these animals inhabit high places. The tender horns of the stag are also eaten fried, and are vulgarly called *tete or cru de cerf*, (typus cervi.) Their taste and their smell are pretty similar to that of mushrooms.

4. Hare, (*lepus; lepus timidus, Lin.*) a wild quadruped. Its flesh is black, delicate, and dense; but its great alkalescency promotes the digestion of it: it is very nourishing, and of an exquisite taste, especially that of the young hare. Hippocrates attributes to the flesh of the hare, the property of constipating the bowels, and of augmenting in a small degree, the secretion of urine: (Se de diæta, lib. ii.) The ancients were very fond of the hare, and preferred it to other

meats; but they feared the use of it, because they said, its flesh engendered the melancholic blood.

The soil influences the hare as well as the other animals. Hares of mountains are taller and larger than those of plains; they are also different in color. Those that live in marshy places, have a hard and nauseous flesh. In the high mountains of Switzerland, and in the north they become white during winter, and resume in summer their natural color. In general, hares become white by age, and cold countries produce on these animals, this effect of age. In Lapony, hares are white during ten months of the year, and only resume their fallow color, in the two warmest months of summer. This whiteness does not extend to the roots of the hair, which are not exposed to the air; it protects these animals from the birds of prey which confound them with the snow. Although all climates appear equally proper for the hare, nevertheless, they are very rare in the east, and but few or none of them have been found in South America.

The hare, so much sought for by the Europeans, was held in horror among the orientals. The law of Mahomet, and more anciently the law of the Jews, interdicted the use of the flesh of the hare, as well as that of the hog.

However, its flesh is excellent and wholesome; even its blood is very good to eat. Fat does not contribute any thing to the goodness and delicacy of the flesh of the hare, for this animal is never fat, except when deprived of liberty, then it very often dies with an excess of fat.

5. Otter, (*lutra; mustela lutra, Lin.*) a carnivo



rous animal, and an inhabitant of rivers, lakes, and ponds, in the southern and temperate parts of Europe, Asia, and America. The flesh of the otter eaten when lean is hard, tough, has an offensive odor, similar to that of putred fish, and a bad taste of the marshes; it is difficult to digest, and is generally an unwholesome and a disagreeable aliment.

6. Hedgehog, (*echinus terrestris*; *erinaceus europæus*, *Lin.*) a small ground animal. Its flesh is astringent, of a difficult digestion, and not very nourishing. In the Indies, it is white, and furnishes a wholesome nourishment.

7. Rabbit, (*cuniculus*; *lepus cuniculus*, *Lin.*) a quadruped; originally of warm climates, and to which it is supposed the property of ruminating belongs; it has a strong resemblance to the hare. The female of the rabbit as well as that of the hare, has two wombs, and is subject to frequent superfoetations: Both admit the male immediately after delivery. The rabbit differs from the hare in taking but very little exercise, and in its flesh being white and very insipid. It also differs from it in many other respects, but these differences regard their natural history, and are not within our sphere. As rabbits pass the greater part of their lives in the ground, where they remain quiet, they acquire more fat than the hare. Castration not only renders them fatter, but also makes their flesh more delicate. Those that live in dry and mountainous places are the best to eat. Young rabbits have a very white and tender flesh, but that of the old one is dry and tough. The wild rabbit is preferred to the domestic: it has a finer and more delicate taste, and it furnishes an aliment of an easy digestion.

8. Fox, (*vulpes; canis vulpes, Lin.*) a fallow carnivorous quadruped, originally of cold countries; the flesh of which is not much esteemed. Buffon pretends, however, after Galen, that it is very good in time of vintage. It was used as an aliment in the time of Hippocrates, for he says that it is humid and diuretic: *Vulpinae carnes humidiores sunt, (leporinis) et urinam cient, (de diæta, lib. iii.)*

### ARTICLE III.

#### *Of Birds.*

The flesh of birds, is in general, light and of an easy digestion; it repairs much and very promptly: But, as that of the wild quadrupeds, it is less nourishing than that of the domestic quadrupeds, because it is very perspirable, in consequence of its alkalescency. It was of these animals that Hippocrates is to be understood as speaking, when he said: "Those articles, copiously and quickly nourish, but they soon pass off."

The flesh of birds is, says, Hippocrates, dryer and contain less moisture than that of other animals, because they excite but little excretion: "The flesh of those animals that have no bladder, neither pass urine, nor secrete saliva is very dry." What is certain, is that birds are of all animals, those which live upon the dryest aliments, and which drink the least.

However, man may change the nature of birds, as he does the animals subjected to his empire, and which he has associated with him in his labors; by means of regimen, confinement, and castration; he may render them fat and succulent, and communicate to

them all the properties which castrated quadrupeds possess.

But the birds which live at liberty in the fields, which continually exercise themselves, and which are exposed to the vicissitudes of the season, are extremely dry and hard; and these qualities are more sensibly increased in them by age, than in any other animals. A very great difference is also remarked in different parts of the bird, accordingly as they are more or less exercised. Those that walk more than they fly, have thighs stronger and harder than the wings; on the contrary, those that use the wings the most, have these stronger and the meat of them more dense, than that of the thighs.

The flesh of the birds which live upon grain and vegetable berries, is justly preferred to that of those which live upon insects and fish. As to those that find their food among the carcasses of animals, and in the deposits of putrefaction, they are not used. In addition to the flesh of these animals being bad aliment, they inspire one with an aversion, which extends to horror. Those birds that live in water, do not afford so wholesome an aliment, as those that do not. In general, the meat of birds is not so salutary nor so good in spring, as it is in the other seasons, because spring is the season of their amors, it is also the period in which emigrants return to their common abode. Barn yard fowls, to which we give an abundance of food, are preferable to wild ones.

SECT. 1. *Of Birds which live upon grain, seed, or berries.*

1. Lark, (*alauda*; *alauda vulgaris*, *Lin.*) is the messenger of spring, and lives in meadows and fields

sown with grain; it rises vertically in the air. This bird emigrates in November; its flesh has an exquisite taste, especially in autumn, it is easily digested, and is an excellent and delicate meat.

2. Goose, (*anser; anas anser domesticus, Lin.*) an aquatic bird, with palmated feet. There are wild and tame geese; the first change climates and go in flocks, disposed in two lines which form an angle. The goose lives upon herbs and grain, and takes but little exercise; those that live in damp and marshy places, are taller and larger than those that inhabit dry places. The flesh of the wild goose is alkalescent, and digests pretty easily. It is not the same with the domestic goose, which, though good to eat, is less salubrious, and of a difficult digestion; its use is only proper for robust persons, and those who take much exercise; when too young, its flesh is viscous and not very soluble; when, on the contrary, it is too old, its flesh is hard, tough, and indigestible. The goose is eaten roasted or in ragout. In some countries, they make pies of the thighs of geese, which are much esteemed; in other places they are *marinated*.

A cruel sensuality has invented an atrocious means to fatten geese, and to render the liver voluminous; this is highly esteemed, very nourishing, but not friendly to the stomach. At Strasburg, they make excellent pies of the liver of geese, which are much esteemed, and which they send throughout France, and even to foreign places. The poorer people eat goose eggs, but they are not so good as hen's.

3. Goldfinch, (*carduelis; fringilla carduelis, Lin.*) thus called because it is commonly seen in thistles and pines, and makes their seed a part of its nourish-

ment; its flesh is easy to digest, and furnishes good chyle. It is the same with the red throat, (*motacilla rubecula*, *Lin.*) fig-pecker, (*motacilla ficudela*, *Lin.*) and several other birds of this genus, whose flesh is very nourishing, of an excellent taste, and easy to digest.

4. Pigeon, (*columba*; *columba domestica*, *Lin.*) a wild or domestic bird, and the symbol of domestic love. There are many species of them, the principal of which are the ring dove, stock dove, glouglou, pround, nun, rough footed pigeon, crested pigeon, turtle dove, white pigeon, messenger, &c.; the latter transported far from its place of residence, will find its way home with facility, as soon as set at liberty. There also foreign pigeons which are not of the varieties of the preceding species. The flesh of the pigeon contains much gluten, it is extremely alkalescent, and justly occupies one of the first ranks among the black meats. The young pigeons or squabs are preferred; they are very tender, very nourishing, and digest easily. The most esteemed in France are those of Perpignan. Old pigeons should be used in moderation; their flesh is heavy and indigestible. The wild pigeon, and especially the ring dove, (*palumbus*; *columba palumbus*, *Lin.*) which are the most used, have a dry hard flesh, which is not easily dissolved in the gastric juice, but it has a very agreeable taste. In general the flesh of the domestic pigeon digests more easily than that of the wild, which is dryer and hotter. Of all the foreign pigeons, those of Louisiana are the best, and have the finest and most delicate taste. In those parts of America where there is much woods, these birds are of an exquisite taste, and so



fat that they frequently perish in falling to the ground, when a tree is shook. At the Cape of Good Hope, the mountain pigeons and those of the woods are much esteemed.

5. Quail, (*coturnix*; *tetrao coturnix*, *Lin.*) a bird of passage, whose flesh is very delicate and very nourishing. When the quail is young, tender, fat, and nourishing, it is an exquisite meat, but a little difficult to digest, owing to the fat with which it abounds.

6. Ortolan, (*hortulanus*; *emberiza hortulana*, *Lin.*) a bird of passage, which is very similar to the quail in its alimentary qualities; this bird is very fat, and has a tender, delicate, and succulent flesh, which is of an exquisite taste; it furnishes a restorative and fortifying nourishment; it is met with in warm countries from May to September.

7. Wood hen, (*gallina corylorum*, *attagen*, *tetrao-bonasia*, *Lin.*) a bird which inhabits groves and places planted with pines; its flesh, which whitens by cooking, is more delicate and not less wholesome, than that of the partridge; it is tender, soluble, succulent, and of a very agreeable taste. The wood hen was much esteemed among the ancient Romans; its variety causes it to be much sought. Louis XIV. made exertions to multiply the wood hen in our country, as the pheasants, but unsuccessfully.

8. Cock, (*gallus gallinaceus*; *phasianus gallus*, *Lin.*) a domestic fowl originally of India, the mythologists of which have made it the symbol of vigilance, doubtless because it crows during the night. A cock was formerly sacrificed to Esculapius, when a patient was cured. The flesh of the cock, as well as that of

the hen and chicken, is white; it contains much gelatin, and but little gluten; it is also less alkalescent, and consequently less irritating and not so heating as many other kinds of meat. Cocks, which frequently indulge in the pleasures of love, have a dry and tough flesh; it digests with difficulty, and is only proper for soups. The hen, which has laid eggs, has also hard flesh; it is not so with that of the chickens, it is very soluble and very easy to digest; but at the end of a year, it becomes hard and tough. Previous to this period, the difference of the flesh which results from the sexes, is not very obvious, and castration produces marked effects upon those fowls; the capon and the pullet fatten easily by this means, and remain tender very long; their flesh digests easily, is nourishing, and of an exquisite taste. The method of depriving hens of their ovaria, is of ancient date; it is spoken of in Deuteronomy; it was practised at Rome, and these people had chickens that weighed as much as six pounds. This practice was finally interdicted, and to elude this law, they castrated their young cocks.

The Guinea hen, (*numida meleagris*, *Lin.*) is as nourishing as the hen. It is the same with the turkey, (*meleagris gallopavo*, *Lin.*) whose flesh, however, is not so soluble, but more alkalescent. That of the peacock, (*pavo*; *pavo cristatus*, *Lin.*) is still less soluble; the Romans, nevertheless, had it served upon their tables, but rather as a luxury, than for pleasantness of taste.

It is the eggs of the hen which are used as an aliment; they contain a nutritive substance, destined to the development of the germ and for its nutrition; hence they are very nourishing. The white of the

egg, or albumen, taken in a liquid state, begins to coagulate as soon as it is received into the stomach, and is afterwards dissolved by the gastric juice. There are stomachs which cannot digest it, and in which the smallest quantity of the white of an egg, even in a liquid state, produces a very great uneasiness, and an inexpressible anxiety; however, the greater part digest it easily; it is very alkaliescent, and putrifies with the greatest rapidity; it is more difficult to digest when it has been hardened by heat. The yellow is a very soluble and a restorative emulsive substance. The egg is, in general, very nourishing and of an easy digestion; its use is particularly proper for weak and delicate persons; it repairs the energies very well, and is an appropriate aliment for valetudinarians, for the infirm, and for convalescents. "The eggs of birds are strong, nutritive, and fattening; they are strong because of animal origin, nutritive being the food of the chick, and fattening because, from a small particle they become much enlarged."—Hipp. de vict. rat. san.

Eggs are not proper in a fever, especially in a bilious fever. Fresh eggs are the best and most wholesome; those recently laid are thus called, and all those even which preserve that part called the milk, which is found on first opening them, if not too much cooked. Reaumur discovered a simple and easy method of preserving eggs for sea voyages, and for use in the seasons when the hens rarely lay; it consists in coating the eggs with two or three layers of common varnish, or with a thin layer of mutton fat, oil, or melted wax, to prevent the access of air. Experiments prove that eggs may be kept in this manner for more than six months. But for the greater certainty, and to keep

them fresh as long as possible, non-fecundated eggs should be chosen; otherwise the germ heated under the varnish, will corrupt a part of the egg. Eggs thus varnished, have still the advantage of being successfully subjected to incubation, provided they are not kept beyond six weeks; they must be deprived of the varnish before they are subjected to this process. This method may also be employed to raise foreign birds, which cannot be transported alive out of their country without much trouble, and which, ordinarily, do not engender out of their native country.

The Egyptians, from whom we have derived the greater part of the sciences and arts, possessed the secret<sup>†</sup> of hatching birds without the aid of their mothers. Reaumur discovered this same secret by means of experiments, and has reduced it to an art; it consists in exposing the fecundated eggs to a heat of thirty-two degrees and an half of his thermometer, in dung, ovens, stoves, sea-bath, or the vapor of water, which is preferable; by supporting this heat, we generally have chickens hatched the twentieth day, that is to say, a day sooner than they are hatched by natural incubation, doubtless because the egg is not exposed to cooling from time to time, as those are which are covered by the mother. As to the manner of raising the chickens, we will refer the reader to the excellent work of this learned naturalist, entitled the "*Art of hatching and raising domestic fowls of all kinds, in every season, &c.*"

9. Bustard, (*otis tarda avis*; *otis tarda*, Linn.) a bird of the size of the turkey cock, which only lives in our country in the coldest weather of the winter; in this season, bustards are in great flocks in the plains,



and do not separate until May, which is the season of their amors; the flesh of this bird tastes like that of the turkey, and is very hard, it is with difficulty that it can be softened by boiling it in a close vessel; it is an aliment which can only be well digested by strong and robust persons. Hippocrates recommended those that were afflicted with epilepsy, to abstain from the use of it. (Lib. de morb. sævo.)

10. Sparrow, (*passer; fringilla domestica, Lin.*) This bird, though fat when young, is but rarely used as analiment, except by the lower class of people; its flesh is lean, dry, not rich, and hard. The vulgar prejudice is, that this animal being subject to frequent fits of epilepsy, occasioned by excesses in the pleasure of love, the use of the flesh may cause this disease; but if this has ever been the case, it has, doubtless, only been to persons, who have eaten it with the design of exciting themselves to the pleasures of love, and by abusing this passion.

11. Partridge, (*perdix.*) It lives not only upon vegetables, but also upon wheat. There are three principal species of this bird: 1. The grey partridge, (*tetrao perdix, Lin.*) which is met with in the north and temperate parts of Europe; its flesh is very savory, easy to digest, and is a good aliment; it is kept for some days previous to being cooked. The flesh of this bird furnishes a soup of a good juice, which is restorative, and very salutary to exhausted persons, and to convalescents; it contains much gluten, and from this circumstance it is proper for pituitous persons. 2. The red partridge, (*tetrao rufus, Lin.*) which are found in warm countries; their juice is more animalized than the former. 3. The Greek par-



tridge, (*perdix Græca; tatrao Græcus, Lin.*) which is common in Italy, and which are also found in the mountains of Switzerland; this species has a savor still more exquisite than the two preceding. Aretee recommended the use of the flesh of the partridge in eliphantiasis. Hippocrates prescribed them roasted, but without seasoning in diarrhea, (lib. iii. dediæta.)

12. Pheasants, (*phasianus; phasianus colchicus, Lin.*) a bird of the woods, originally of Colchidia, so called from a large river of the Phasis. Its flesh has a delicious taste, digests easily, and furnishes an excellent aliment. It is kept some days in order that it may become softer by a commenced putrefaction; it is from this circumstance that the word *phasandier* is derived, which we commonly give to meat that is putrefied a little, by being kept for some days after the animal has been killed.

13. Thrush, (*turdus; turdus viscivorous, Lin.*) There are several species of this bird which live upon berries and insects. They are nourishing and easy to digest, and are best at the approach of winter. The thrush is passionately fond of the seed of henbane. In the vineyards they eat many grapes, of which they are extravagantly fond, and fill themselves with them in the time of vintage, which fattens them considerably, and which has given rise to the proverb: *as full as a thrush*. It is the little thrush, (*turdus; musicus, Lin.*) which is the most delicate and most agreeable to the taste; this is the reason Martial has given it the first rank among birds, as he has the hare among quadrupeds.

14. Blackbird, (*merula; turdres merula, Lin.*) a bird of the same species as the starling and thrush,

which emigrates in autumn, and returns in spring. There are several species of this bird. Blackbirds which do not emigrate are almost all males. The flesh of these birds are only esteemed in time of vintage, owing to their eating the grapes at that season; it is bitter when they are reduced to the necessity of living upon juniper berries, ivy seed, &c.

15. Woodgrouse, (*uro gallus; tetrao urogallus, Lin.*) of which there exists two species; they are found in places planted with pines, fir trees, upon the mountains, and in the northern countries. They live upon the buds of the fir tree, the taste of which they retain during summer, they also live upon berries and insects. This bird is highly esteemed by epicures; its flesh has a delicious taste, but it is a little hard and dry, and does not digest very easily.

SECT. 2. *Of birds which live upon insects.* The effect which exercise produces upon certain parts of animals, are well marked in the birds of this class. The woodcock and the snipe, of which the muscles of the breast are much exercised by flying, have these parts of a firm and less soluble tissue than the others; on the contrary, the thighs which are but little exercised, are much more tender.

1. Titmouse, (*parus; parus major, Lin.*) a genus of very pretty little birds, of which there are several species. We meet with them in autumn, in the gardens and in woods. They live upon nuts, gnats, and carcasses. The lower class of people eat the flesh of these birds; it is not very pleasant: on the contrary, it has a disagreeable taste, and does not digest easily.

2. Golden plover, (*pluvialis; charadrius pluvialis, Lin.*) Its flesh is very delicate, of an agreeable taste,

and easy to digest. This bird becomes sometimes, very fat; hence, the proverb "*as fat as a plover.*" Notwithstanding this excessive fatness, and its delicacy, its flesh is not very nourishing.

3. Water rale, (*rallus; rallus aquaticus Lin.*) It has an agreeable taste, but digests with difficulty.

4. Woodcock, (*scolopax, rusticola major; scolopax rusticola, Lin.*) It inhabits marshy places, and furnishes an excellent aliment in autumn. It has an exquisite taste, is very nourishing, but does not digest easily.

5. Snipe, (*gallinago, rusticula minor; scolopax gallinago, Lin.*) a bird of passage, which is fond of marshes and rivulets. Many of them are seen in the southern departments of France. They are very common in Holland, during winter. The flesh of this bird is delicious, and much esteemed; it is more sapid, and more easy to digest than that of the woodcock.

6. Starling, (*sturnus; sturnus vulgaris, Lin.*) a bird well known by the beauty of its plumage, and of which there are many species. They live in marshes and ponds. Starlings are hunted in the time of vintage; at this period they are fat and good to eat. The ancients were very fond of the flesh of the starling, and frequently used it. In our days, many epicures esteem this bird. But its head exales in a slight degree the odor of ants, hence, it is taken off previously to seasoning the bird. Its skin is also taken off, for it retains a disagreeable taste, even after having been washed several times in large quantities of water.

8. Woodsand piper, (*tringa; tringa glareola,*

*Lin.*) This bird inhabits meadows and ponds; its flesh is thought tender and easy to digest.

8. Lapwing, (*vanellus; tringa vanellus, Lin.*) an aquatic and open footed bird, which only frequents cold and wet places. They are hunted from the middle of November, until January. The flesh of the lapwing is fat, tender, and easy to digest, but it is not a very good aliment. In Solonge, the inhabitants of the country make excellent pancakes with the eggs of the lapwing. In Holland, where these birds abound, their eggs are much sought for, owing to their delicacy.

### SECT. 3. *Of ichthyophagous birds.*

1. Duck, (*anas; anas boschas, Lin.*) a palmated aquatic bird, of which there are many species, and of which the principal are the wild and domestic. It is the first which has furnished the domestic, and with which it associates willingly. Both are great eaters and insatiable; their gluttony is often fatal to them. They seek their nourishment in the mud and dirt with their bills, they live upon insects, worms, putred fish, frogs, toads, and bad herbs; they also eat the filth of barn yards. When a storm is rising, they cry more than common, flap their wings, and play in the water. The wild duck has a more agreeable taste, and is more easy to digest than the tame one. The first exercises much, and its flesh is more alkalescent; the latter lives almost in inaction, and is nourished much more on filth. Young ducks have as viscous a tissue, and are less soluble than those that are a little older. The flesh of the duck is agreeable and healthy, roasted, not too much it is tender, succulent, and pleasant to the taste. The school of Salerne is



incorrect in attributing to them the property of renewing quartan fevers. An excess in eating of them, as in every other thing, may produce a similar effect.

2. Teal, (*querquedula*) an aquatic bird of the genus of ducks, of which there are several species, (*anas querquedula*, and *anas greca*, *Lin.*) Its flesh is of an exquisite taste, and very easy of digestion. The teals of America, especially of Louisiana, are of a very agreeable taste and delicacy. Small stones, herbs, and seeds of water plants, are very frequently found in their stomachs. The teal of the Isle of Cayenne is also much esteemed; it is of an exquisite taste, whereas, all the large and middle sized game of that country is tough, and smells of oil or musk.

3. Coot or moor hen, water hen, (*fulica, gallina aquatica*) an aquatic bird of the genus of *divers*, of which the principal species are: 1. The moor hen, called felica, (*fulica atra*) 2. The sea duck of Hudson bay; 3. The water hen of Mexico; 4. The monette. The moor hen presents a remarkable singularity, which is, that its ribs are double and cross one another. It lives upon herbs and seeds. Its flesh is good to eat, although a little marshy, and it is a good aliment and easy to digest.

The sea duck is a water fowl. Its flesh is reported lean, and possessing the quality of that of the fish. It is hard, tough, and of a wild taste; but the cooks do away the most of these defects.

The water hen, of which there are two species, the large and the small, has a very savory flesh; which possesses the same qualities as that of the teal.

The monette is a water fowl, not very fleshy, and which is very common in Ireland. The flesh in its



qualities, resembles that of the sea duck. Its eggs are excellent, and as large as those of the duck. The white of the eggs does not harden in boiling water, but always remains as a jelly.

4. Sea swallow, (*sterna*) of which there exists two species, the large (*sterna hirundo*, *Lin.*) and the small, (*sterna nigra*, *Lin.*) The latter is preferred, but in general their flesh is not very tender and soluble, and their taste is not agreeable.

5. Swan, (*cygnus*; *anas cygnus*, *Lin.*) The largest bird of all the palmated kind, and which it is said, served as a model for the improvement of the hull of ships. The flesh of the swan is firm, solid, but little soluble, and very difficult to digest; the young ones are tender, delicate, and pretty good to eat.

There are many other birds of this class, that may be employed as an aliment. The greater part of which are sea birds, that live upon fish; they are alkaliescent, tender and easy to digest. They have, ordinarily, a strong smell, and taste of the fish, which induces many persons to abstain from the use of them.

#### ARTICLE IV.

#### *Of Fish.*

The flesh of the greater part of fish is tender and easy to digest; however, it is not very nourishing, as has been remarked by Hippocrates, and does not repair the energies so much as that of quadrupeds and birds. It also putrefies much more rapidly, and gives by distillation, ammonia. The azote in it is feebly combined with the other principles, as well as in the flesh

of cold blooded animals; consequently, the slightest cause is sufficient to disengage it.

It appears that fish furnishes an abundance of the prolific matter. We see many more children in maritime towns than in any other places; population is extremely great in Japan and China, where the inhabitants live almost entirely upon fish. Hence, the founders of religious orders, as Montesquieu judiciously observes, who wished to subject their unhappy victims to the impracticable law of chastity, have totally failed in their design; by prescribing them the habitual use of fish.

It has been observed, that ichthyophagists are very subject to leprosy, the itch, and to other cutaneous diseases; from which circumstance we should interdict the use of fish to those laboring under these affections, and also when there is a disposition to these diseases.

The Egyptians have remarked, that in countries subject to damp vapors, such as lower Egypt, the use of fish promotes the production of the elephantiasis; hence they detest fish.

Fish furnish a nourishment which is not very perspirable; it concentrates and retains the action in the epigastrium for a long time, there are even persons who after eating fish, experience as long as they remain in the stomach, an efflorescence upon the skin with itching and sometimes fever. These affections are but momentary, and are generally dissipated when the digestion is finished; they immediately cease when the aliment is ejected by vomiting.

Cartilaginous fish are tender and soluble; they contain much gelatin, are very nourishing, even more so than those whose tissue is firm and dry. Oily fish are

also very nourishing, but digest with difficulty, owing to their great quantity of oil; the eel, salmon, and herring, are examples of this species. The herring fishers become fat, without experiencing any diminution of strength, by living solely upon these fishes, which is the case for a certain time in the year.

The ancients, after Hippocrates, distinguished two kinds of fish; those called *littorales*, *saxatiles*, which have a white soft and agreeable flesh, and which are found in the purest water among sand and stones, in rivers and upon the sea coast; and those that are fat and viscous, which live in stagnant and muddy water, in the mud of rivers, ponds, &c. The first are light and easy to digest; Galen recommended the use of them to convalescents, in preference to any other aliments. The others are less easily digested, and have a flesh of a very inferior quality, to those that continually exercise themselves in clear, limpid, and running water. (See also Hippocrates, de diæta, lib. ii.) These are as I have already said, as well as the fish of the sea, very soluble and wholesome, especially when boiled. They are not healthy fried nor roasted, their flesh being cold and insipid, it is proper to season them.

#### SECT. 1. *Fish of currents and rivers.*

1. Sturgeon, (*acipenser*, *sturio*,) a cartilaginous fish, that is to say, instead of bones it has cartilages. There are two principal species of this fish, interesting from their utility. The common sturgeon, (*acipenser sturio*, *Lin.*) which are much esteemed by epicures, and the larger sturgeon, (*piscis ichthyocolla*; *acipenser huso*, *Lin.*) whose flesh is not so good, but from which fish glue is obtained

The sturgeon is a sea fish. As long as it remains in the sea, it does not grow to a very large size, and its flesh is not very good; but it ascends into rivers, and grows to a great size. It is ordinarily nine feet long, and weighs as much as three hundred pounds. In the sea its length scarcely exceeds a foot and an half or two feet. It is in large currents that the sturgeon is found, as in the Nile, Don, Po, Danube, and Rhine. It is also caught in large rivers. It is caught in the Danube from May until September. The flesh of the back has the taste of veal, and that of the belly, that of the hog. The flesh of the male is preferred; it is, however, difficult to digest, owing to the great quantity of fat with which it is surcharged. When it has been dried or salted, it is not so agreeable to the taste, as when fresh; it is more heavy, not so easy to digest, and is only proper for strong and robust stomachs. The roe of the sturgeon is extremely delicate and much esteemed. As the sturgeon is caught in the same places as the salmon, the fishermen call it the conductor of the salmon. The prepared roe of the sturgeon is called *caviar*. The caviar forms a considerable article in the commerce of Holland; it is much esteemed by the Moscovites and Italians, who regard it as a very delicious dish, but it is unwholesome and feverish.

2. Shad, (*alosa; clupea alosa, Lin.*) which some naturalists consider as a species of the herring; it is a fish of the ocean, that ascends into rivers in April, when they are caught, and at which period they are the best to eat. It is necessary that they should have remained some time in the fresh waters of rivers, to become fat and



acquire an agreeable taste; for in coming out of the sea, their meat is dry and of a bad taste. Hence the proverb: *That the rich never eat good shad, nor the poor good lamprey.* This fish is pretty easy to digest, but it does not afford a very good aliment.

3. Barbel, (*barbo; cyprinus barbatus, Lin.*) a fresh water fish; its flesh is insipid, viscous, and not very agreeable to the taste, but pretty easy to digest. The eggs of the barbel should not be eaten, for they excite nausea, puke and purge, especially in the spring.

4. Bream, (*brama; cyprinus brama, Lin.*) a fresh water fish; its flesh is soft, fat, and of a tolerable quality; it digests with difficulty.

5. Carp, of the Caspian sea, (*cyprinus ballerus, Lin.*) lives in rivers and ponds; it is esteemed as one of the best fish.

6. Dace, (*cyprinus leuciscus, Lin.*) has an agreeable taste, and digests pretty easily. Artificial pearls are made out of its scales.

7. Pike, (*lucius; esox lucius, Lin.*) a fish of lakes, ponds, and rivers, which is very voracious and carnivorous; it swallows other fish almost as large as itself. The tenia or tape-worm has sometimes been found attached to its intestines. The pikes of large rivers and lakes are the most esteemed. There are hermaphrodites of this species of fish, which have, at the same time, a soft roe and eggs. The flesh of this fish is firm, and not very easy to digest; it is, however, much esteemed, and furnishes a good nourishment; its liver is much esteemed by epicures; its eggs produce vomiting and purging, and the common people sometimes eat them as a purge.



8. Perch, (*perca; perca fluviatilis, Lin.*) a sea and river fish, with prickly fins; the flesh of the sea perch is tender, and much better than that of the river; it is said that the first never go into fresh water, and that the latter never go into the sea; the latter are only found in currents and rivers that flow tranquilly; their flesh is very delicate, of an exquisite taste, and digests easily. The eggs of the female perch are eaten fried; they are wholesome, and of an agreeable taste.

9. Salmon, (*salmo; salmo salar, Lin.*) a sea fish, which ascends in rivers, many of them are found in the Rhine from the commencement of spring. This fish prefers, in an especial degree, to ascend rivers when the water is thick and turbid. There are salmon which weigh sixty pounds; this, as well as many other species of fish, are subject to flat or tape-worm; it has a tolerably thick skin, and the flesh is intermixed throughout with fat, more particularly about the belly and head. Previously to being cooked, its flesh is whitish, but when it has been subjected to boiling, it becomes red; it is in general, a very strengthening aliment, and one which is good for strong and robust stomachs. Fresh salmon has a better taste than that which has been salted. Its jawl is very much esteemed, and next to this the belly, but both are more difficult to digest than the other parts, owing to their containing more fat. The little salmon are of a very easy digestion, and are very nourishing. The salmon of the Thames, Rhine, Masselle, Loire, Garonne, Dordogne, and the Aller, are much esteemed; according to the report of voyagers, those caught in the Laponia, are the most excellent salmon of Europe.

10. Grayling, (*thymallus; salmo thymallus, Lin.*) Its flesh is very easy to digest, and furnishes a very good aliment.

11. Trout, (*trutta; salmo-fario, Lin.*) a river fish, which is voracious and carnivorous; its flesh is an excellent aliment, it is very soluble, of a delicious taste, and is proper for convalescents, for the infirm, and valetudinarians. There are two species of them; the preference is given to that called the salmon trout, (*salmo trutta, Lin.*) Its flesh when cooked appears reddish, nearly like that of the salmon, whence it has obtained its name. It has a more exquisite taste than the other species.

#### SECT. 2. *Mud Fish.*

1. Eel, (*anguilla; muræna anguilla, Lin.*) a fish as long as a serpent, covered with a shining skin, without any appearance of scales; it is voracious and carnivorous, and is the only fresh water fish that goes into the sea. The eel remains almost always under water in the mud; if it raises from thence, it is only at the approach of storms, the atmospheric electricity then agitating it; its flesh is very agreeable, but it is digested with difficulty, owing to the fat with which it abounds. It should be eaten roasted with seasoning to aid the digestion of it. No eels are found in the Danube, nor in the other rivers which empty into this large one. Moreover, if any are found in it, they soon perish; the cause of this phenomenon is not known.

2. Gudgeon, (*gobius fluvialilis; cobitis barbatula, Lin.*) Its flesh is hard and tough, and it is justly included among the number of heavy and indigestible aliments.

3. Carp, (*cyprinus; cyprinus carpio*, *Lin.*) a fresh water fish, which is extremely fruitful; there is an abundance of them in the rivers, ponds, and marshes, but they are never found in the sea. The carp lives to a great age, and in certain rivers grows to the length of three cubits; they succeed very well in ponds, and it would seem as though they were destined for such places; however, those of ponds are not so good as those of rivers; they spawn in the month of May and September, and at these periods they are not so good to eat, owing to their being lean and insipid, as is the case with almost all other fish during the term of spawning; they are the best in February, March, and April. The carp affords an excellent aliment, which is easy to digest. It has been said, that its use has excited fits of the gout in those who are subject to this disease. The soft roe of this fish is a very delicious article, and one that furnishes a substantial nourishment.

4. Loach, (*cyprinus gobio*, *Lin.*) a small fish of rivers and ponds. Its flesh is of a tolerable quality. It is ordinarily eaten fried.

5. Lamprey, (*lampetra; petromyzon fluviatilis*, *Lin.*) a cartilaginous sea fish, which ascends into currents and rivers in the month of April. The lamprey is better to eat in the spring, than in the other seasons. Its flesh is tenaceous, and has the taste of mud; it is very nourishing, and augments the seminal fluid, but it is not very soluble, and digests with difficulty. De la Condamine says, that there are in the Amazons lampreys which possess, as the torpedo, the property of exciting the electric commotion, to those who touch them with the hand or with a stick.

6. Burbot, (*mustela fluvialis*; *gadus lota*, *Lin.*) a fish with soft and spiny fins, which is met with in lakes and rivers, especially the Saone and Iser. Its flesh is of an exquisite taste, and it is an excellent aliment that digests easily. Its liver is very much esteemed, and is very large relatively to its body. Its eggs are bad and purge violently, the same as those of the pike and barble.

7. Tench, (*tinca*; *cyprinus tinca*, *Lin.*) a fish of the lakes, ponds, and marshes, with soft fins. The tench is subject to the tape-worm. Geoffroi the younger, found this worm in a very healthy and fat tench; this worm was similar to that met with in man, with this only difference, that it was not divided by rings. It was entire, and two feet and an half long. The flesh of this fish has a pretty good taste, especially when it lives in clear water which is not stagnant; but it is not very nourishing, and digests with difficulty.

### SECT. 3. *Sea Fish.*

1. Stock fish or cod fish, and the mell-well, of the family of the gadus, (*gadus morhua*, *Lin.*) which is found in the Southern ocean, and especially near Newfoundland, as well as in the Baltic sea. These animals live upon fish and crabs. The fishing of them commenced in the fifteenth century; they are caught from the end of June until October; when fresh they have an exquisite taste and are very nourishing. The males are much more esteemed than the females. As to those which are sent into our country, (France) dry and salted, they are not easy to digest; they owe all their agreeable taste to the seasoning with which they are dressed; but though they be long macerated



in water, they are, nevertheless, always hard and tough, and consequently not very soluble.

2. Whiting, (*merlangius; gadus aegelfinus, Lin.*) a sea fish which is very abundant in the Baltic and towards the banks of the south of France; it, as the preceding, lives upon fish. The flesh of the whiting is soft, tender, light, and better roasted than boiled; it is very nourishing, and the use of it may be permitted in all ages and to all constitutions, even to patients and convalescents. The whiting, when salted, is not so wholesome nor so easy to digest, as when fresh.

3. Anchovy, (*clupea; clupea encrasicolus, Lin.*) a small fish of the Mediterranean, very delicate, and without scales, which is sent into most countries salted. It is a seasoning which is mixed with other dishes, the viscosity of which it is desirable to correct; it is also used to excite an appetite. The best anchovies are those that have not been long salted, which are tender, white externally, and reddish internally, small, fat, and firm. The Greeks and Latins made with the anchovies, dissolved in their brine, a sauce which they called *garum*, and which was used as a seasoning with other fish.

4. Herring, (*halec, harengus; clupea harengus, Lin.*) a fish of passage, which comes in immense numbers from towards the north, and especially from the lakes of Kamtschatka in the German seas. The catching of these fish, which commenced in the year 1565, begins about the middle of June, and finishes in December. There are several species of herring, which the merchants of Belgium distinguish very well. Fresh herrings have a white meat of a very



good taste, and which digests easily, but in a salted state, which is that in which we (the inhabitants of France) receive them, they are indigestible and unwholesome; those that are soaked are less so. Smoked herrings are very dry, hard, and pernicious.\*

5. Sarden, (*sardina; clupea sprattus, Lin.*) a small sea fish, with soft fins, of the genus of shad, which are caught in the Mediterranean and in the ocean; it differs but little from the anchovy, and it, as that, is principally used as a seasoning. From the sarden is expressed an oil, which is an article of commerce. It is salted, and by this means preserved.

6. Tunny, (*thymnus; scomber thymnus, Lin.*) a large fish of the family of *cetacia*, of about one hundred pounds weight. Tunnies leave the ocean about the beginning of summer, and enter the Mediterranean, where they are caught in large quantities. The flesh of the tunny is red, hard, and very nourishing, and is similar in taste to that of veal; but it is heavy, and does not easily digest in weak and delicate stomachs; it is also less easily digested when salted, and it is in this state that it is sent throughout Europe; it is cut up in slices under the name of *tunnin*. The most tender part of it is the breast.

7. Dolphin or porpos, (*delphinus; delphinus phocaena, Lin.*) a large fish of the *cetacia* family. Its

\* Our rivers, &c. abound with fish; there are several kinds caught in the different parts of the United States, with which our author does not appear to be acquainted. But it would be of little use to enumerate a few, unless I could give a better history of them, than my opportunities have enabled me to acquire. Herrings are very abundant in the Chesapeake bay, and the rivers that empty into it; they, perch, and shad, are all caught in great quantities in these rivers. The time of catching them commences generally at the commencement of spring, and continues until the beginning of summer.—Tr.

flesh resembles that of beef and hog, but is blackish, exhales a bad odor, and digests with difficulty. Fat and lard are extracted from it, which has obtained it the name of the sea hog.

8. Ray or thornback, (*raia*, *Lin.*) a cartilaginous fish, of which there are several species. They all have an unpleasant smell, and diffuse an odor of the sea, which is lost by keeping them some time. The transported ray is better than that which is eaten fresh. The flesh of the latter is hard and difficult to digest, but when it has been putrefied to a certain degree, it is a good aliment and digests easily. In the interior of France, its liver is much esteemed, and on the maritime coasts of England and Holland, they are fond of the fish.

8. Mackerel, (*scomber*; *scomber scombrus*, *Lin.*) a sea fish thus called, because at the commencement of spring, it follows the small shad, which are the females of the shad, and conduct them to the males. It is said the mackerel pass the winter in the north; in the spring they enter the Atlantic ocean: hence a vast number repair to the Mediterranean, and others enter the Manche, a part of these go into the Baltic sea, and others return to the north. The flesh of the mackerel is compact, without bones, easy to digest, of a very pleasant taste, and nourishing. The Icelanders despise this fish so much that they do not wish to catch it.

10. Sea scorpion, (*scorpena*; *scorpena horrida*, *Lin.*) a fish with spiny fins, which lives upon the shores and in the mud. It is so thickly set with needles or spears, that it can only be taken by the tail; its prick causes an inflammation, accompanied

with acute pain. Its flesh is hard, but by being kept some time, it softens and becomes tender. It is eaten boiled with vinegar; roasted it is bad.

The water in which this fish is boiled, possesses the quality of opening the bowels.\*

11. Turbot, (*rhombus; pleuronectes rhombus, Lin.*) a sea fish with soft fins, of a rhomboid figure, which is voracious. There are several species of the turbot. Large turbot are caught in the mouth of the Rhone. The ocean furnishes those of a still larger size. They are found in the ocean five cubits long, four broad, and a foot thick. The turbot is also called *water pheasant*, in consequence of the delicacy of its flesh, which is white, firm, succulent and very easy to digest.

12. Round tail manati, (*trichechus manatus, Lin.*) called by the Spaniards *manati*, it has been very frequently compared with the hippopotamus, the phouque, sea lion, &c. This fish constitutes the link between the quadrupeds and *cetacia*. It is found in the river Amazon, and in several other large rivers of America. There are also manati in the Nile, Senegal, in China, and in Canada. Some of them weigh from one thousand to twelve hundred pounds. The flesh and fat of this fish is analogous to that of veal. They have along the body a layer of fat, four or five inches thick; which is firm and pretty similar to that of the hog, and which may, when melted, supply the place of butter, it does not soon become rancid. The flesh of the manati is of a good taste, especially

\* Sea scorpions or lobsters, crabs, &c. are very unwholesome, and should be used as a diet very sparingly. Those who have weak and irritable stomachs, should entirely refrain from using them.—*Tr.*

that taken from the middle of its sides, as far as the belly; it, as well as the manilla, is very delicate and very succulent. The inhabitants of Gaudaloupe, of St. Christopher, Martinique, and the neighboring islands, make very frequent use of it. The skin of this fish is tanned, which, when well prepared, affords a very good and very strong leather.

13. Sole, (*solea; pleuronectes solea, Lin.*) a sea fish with soft fins, which grows to a great size. It is also called sea partridge, owing to the goodness of its flesh, which is wholesome and nourishing.

14. Red surmullet, (*rubellio; mullus barbatus, Lin.*) a sea fish with spiny fins, which has nearly the figure of the sea swallow. It has been called *rouget*, because it is red externally. It is very voracious and devours the small fish. Its flesh is white, firm, and slightly glutinous; it has a very good taste, and is supposed to be very prolific.

15. Sea dragon, (*araneus piscis; trachinus draco, Lin.*) a fish with spiny fins, which is caught in the ocean and in the Mediterranean. The prick of their fins, which serve them for defence, occasions a high degree of inflammation; these fins, do not lose their pernicious property even after the death of the animal; hence, the police have ordered that fishermen cut them off. To cure the poison occasioned by their prick, the part affected is to be dressed with acrid and volatile substances, such as alcohol, a mixture of onions and salt, or, which answers very well, the bruised liver of the same animal. The flesh of the sea dragon is white, tender, firm, of a very good taste and easy to digest.

16. Burt, or bret fish, (*pleuronectes limanda, Lin.*)



a flat sea fish, rather large and with soft fins; its flesh is white, soft, and a little glutinous; of a pretty good taste and easy to digest.

17. Smelt, (*salmo eperlanus*, *Lin.*) a small fish thus called, in consequence of its whiteness, which resembles that of pearls; it is spawned in the sea, and afterwards ascends into rivers, especially the Seine; the smelt which are the most esteemed, are caught about Candelbec from the end of summer until the end of winter; the flesh of this fish is tender, of an exquisite taste, smells of violets, is of an easy digestion but not very nourishing; it suits all ages and all constitutions.

There is also a sea smelt which has a thicker and shorter body. It is only good coming from the sea: caught elsewhere it is unwholesome.

18. Gold fish, (*aurata vulgaris*; *sparus aurata*, *Lin.*) a sea fish, thus called from a golden colored line which extends from the head to the tail. The gold fish, which is the mortal enemy of the flying fish, is very common in both the Indies, in Africa, and in the Mediterranean. It has a better taste in summer than in winter. Gold fish are frequently used in the southern departments of France, about the end of the winter. Its flesh is white, firm, of an agreeable taste, and easy to digest.

#### ARTICLE V.

#### *Of Amphibia.*

The name of amphibia, has been given to animals which live alternately upon land and in the water.



They constitute in some degree, the link between terrestrial animals and fish. The amphibia are somewhat similar to fish in their alimentary qualities; they live most generally in marshy places, and take but little exercise. In this class, there are only the frog and turtle which are employed as aliments.

1. Turtle, (*testudo*, *Lin.*) an oviparous amphibious animal, of which there are three principal species, the land tortoise, the sea and the fresh water tortoise, which differ but little in their alimentary qualities. The flesh of the tortoise is very irritable, it has this property in common with all the cold blood animals. Their heart has three ventricles.

The fishermen catch the sea turtle by turning it upon its back. The islanders of the Antilles distinguish them into three species; the *tortue franche*, *caouanne* and *caret*. The first, called *jurucua*, by the Brazilians, and *turtaruga* by the Portuguese, is much sought for by mariners, on account of its flesh and eggs, which are excellent. A single turtle of this kind may furnish two hundred pounds of white flesh, which, in its properties, has considerable resemblance to that of young quadrupeds, and which they salt; the female lays upwards of two hundred eggs, which may be kept for a long time. The scale of the *tortue franche*, and of the *caouanne*, is generally four feet six inches long by four wide. These two species resemble each other pretty much in form; but the flesh of the *caouanne* is black, filamentous, and of a bad taste, and furnishes an oil which only serves for lamps. The *caret* is very large, and its shell much sought for, but its flesh is not so delicate as that of the *franche*. There is also another species of the tor-

toise, called *green turtle*, the shell of which is greener than that of the two preceding, very thin and transparent. The fresh flesh of this species is as delicate as that of the best veal.

The eggs of the turtle are of a round shape, and of the size of a hand ball; the shell of the egg is very soft, and the white does not coagulate by heat, as that of other eggs.

The flesh of the turtle gives, by analysis, a very small quantity of amonia; it furnishes much gelatin, and it is slightly perspirable, it is refreshing, and digests very promptly. Rich and wholesome soups are made with turtle flesh, which suit very well in coughs and consumptions.\* Barrere says, that the use of the flesh of this amphibia, preserves the negroes from the *pian*. The leprous of Portugal, as well as the scorbutic, go to Cape de Verd, to live upon the meat of the turtle to obtain a cure.

2. Frog, (*rana*) an oviparous amphibious animal, whose heart has but one ventricle. Several species of frogs are distinguished; the principal of which are, the brown land frog, (*rana temporaria*, *Lin.*) the tree frog, called also *raine*, or green frogs, (*rana arborea*, *Lin.*) and the water frog, (*rana esculenta*, *Lin.*) which is the most common species.† All are carnivorous, and live principally upon insects and reptiles. The water frogs are the most sought, and are the best; the flesh of these animals differ but little

\* *Turtle diet.* From the knowledge that I possess, of these diseases as they prevail in this country; I am confident that our turtle soups would be highly injurious as a diet to those affected with them.—*Tr.*

† This is not the case in this country. The toad and spring frogs are most numerous here. It is only the bull frog that is used in this country as a diet.—*Tr.*

from that of the turtle; they contain less gelatin and are more *animalized*, which renders them more perspirable. The frog is very irritating, rather hard when fresh, but becomes tender at the end of several days; it digests pretty easily, is tolerably nourishing, and is refreshing and relaxing. Soups are made with the meat of the frog, which are used as that of the turtle.

## ARTICLE VI.

*Of Insects.*

This numerous class furnishes but a very few species which are used as an aliment. There are only some crustacea, such as the sea craw-fish, (*cancer gammarus*, *Lin.*) craw-fish, (*astacus*, *Lin.*) the locusta, (*locusta*, *Lin.*) and the shrimp, (*crangon*, *Lin.*) which are eaten by man.

Both species of the craw-fish furnish, by analysis, but a small quantity of ammonia; hence, their flesh is less animalized than that of the most of other animals; it is more difficult to digest and not so nourishing. There are persons who cannot eat lobsters or craw-fish, without experiencing almost immediately severe cholics, other persons are afflicted with an efflorescence on the skin, similar to that spoken of when treating of fish. Some observations, not perhaps sufficiently established, seem to prove that the use of craw-fish produces a sudden return of the gout, in those who are subject to this disease.

## ARTICLE VII.

*Of Shell Fish.*

Shell fish are testaceous worms, with soft bodies, without any sensible articulation, and entirely, or in part enclosed in a solid shell, which is formed of the carbonat of lime.

1. Oyster, (*ostrea*) a genus of the bivalve shell fish, of which there exists many species. It is the common oyster, (*ostrea edulis*, *Lin.*) which we use. As to the green oysters, which are supposed to be the best, their color is acquired by being burned for thirty days along the shores of the sea, in holes of three feet, the bottom and sides of which are lined with fine green moss; and which are only inundated by the high tides of the new and full moon; there are a kind of flood gates left, through which one half of the water flows. Oysters may be rendered green by keeping them enclosed for some time in creeks lined with verdure.

The oyster digests easily, when it is fresh and raw; it is not the same when boiled or roasted. It is very nourishing, and excites the appetite, but is not perspirable, for it obviously diminishes the perspiration, as is proved by the experiments of Sanctorious and Keil. Oysters are slightly laxative; they are eaten raw or cooked; they are justly considered *aphrodisiacum*.

2. Muscles, (*musculus; mytilus*, *Lin.*) a genus of bivalve shell-fish, of the sea, rivers, and ponds.

Sea muscles are preferable to the others: they are in fact, much more agreeable to the taste, and more healthy than those of rivers and ponds. They

should be tender, delicate, and well nourished. Their flesh is firmer than that of the oyster; they appear to have other properties, with this difference, however, that they digest with more difficulty, and frequently produce upon the skin an efflorescence, accompanied with nausea, vomiting, and sometimes convulsions. Hence, their use must be considered insalubrious for weak and delicate stomachs. The cockle bivalve shell-fish resembles the muscle in its alimentary qualities.

3. Snail, (*cochlea*; *helex promatia*, *Lin.*) testaceous worms, or univalve shell-fish, *androgynieor*, hermaphrodites, which live upon vegetables. There are several species of the snail; they are all glutinous and viscous, and are, although well seasoned, a heavy article of diet. Nevertheless, the Greeks and Romans made them one of their favorite dishes; the latter had warrens and ponds where they fattened them. After having soaked snails in warm water, a cooling and softening pectorial soup is made, suitable to calm a phthisical cough. Their flesh is but a little *animalized*, and contains much gelatin.

All the *univalve* shell-fish, which are used as an aliment, possess nearly the same qualities as the snail.



## CHAPTER V.

*Of the preparation of Aliments.*

THE preparation of aliments consists principally in the application of heat, and in the mixture of different substances which are added to them, either to facilitate digestion, and render them more agreeable to the taste, or to preserve them.

Boiling has very great advantages, even as respects the aliments furnished by the vegetable kingdom; it renders them more soluble in the gastric juice; those even which coagulate at the heat of boiling water, and which become by that means insoluble in this fluid, are more easily acted on by this juice. Besides, the action of heat is such, that it separates and dissipates the nutritive volatile parts, some of which in certain plants, are pernicious. The application of caloric or heat to alimentary substances, has still another advantage, which is that of disengaging the air contained in them, and of thus destroying the cohesive force which renders them more soluble and simultaneously less flatulent.

Heat is applied to aliments in two ways, or rather they are subjected to its operation in the humid and dry way; the first consists in the boiling of them in a liquid, and cooking them in a stove; the second, in roasting, boiling, &c. Boiled meat is that which is cooked in water. By uniting heat with water, we render the tissue of the meat tender, and thence dispose it to dissolve more readily and more com-

pletely in the gastric juice, and consequently render digestion easier. By this method, we may considerably soften the tendinous, ligamentous, and membranous parts, and extract from them a gelatin.

The fleshy parts, whose tissue is softer and more tender, is variously affected by boiling, according to the different degrees of heat applied; their tissue may be rendered more tender and soluble without considerably diminishing their nutritive qualities, if they be cooked moderately; but if the heat is continued too long, so as to extract from them all their soluble particles, what remains after the boiling, contains but a small quantity of nutritive matter, and will not dissolve so well in the stomach; this is the reason why good soups are made by employing but a moderate quantity of meat; this is dry, hard, and not very nourishing, having imparted to the soup the greater part of its nutritive principles.

The effect of boiling is also different, according as the meat is cooked in open or close vessels. In the latter there is none or but very little evaporation, and the meat becomes not only softer, but it also preserves all its sapid and nutritive qualities.

The quantity of liquid employed in cooking meat, also occasions different effects, according to the quantity used. When cooked in a small quantity of water, with a moderate and long continued heat, the meat softens considerably, loses but a small proportion of its soluble parts, and preserves its taste better, and retains more of its nutritive matter; this is properly called *stewing*. But if a large quantity of water is used, and especially if too much heat is applied, the water extracts nearly all the nutritive matter, and

the meat thus cooked, is nothing more than a hard and tough parynchima, which is meagre, and difficult to digest.

The dry method consists in the application of heat, without the addition of a liquid; this species of cooking may be practised the same as the preceding, either in close vessels or in the open air. When meat is cooked in a close vessel, as an oven, or is covered with a paste, there is but a very slight evaporation. Moreover, the juices that are retained, help to cook the meat, to make it tender, and to develop the taste of it.

When meat is boiled there is, in fact, an evaporation, but as the caloric acts immediately on its exterior surface, this is hardened to a certain degree, and the evaporation ceases, or is very small, owing to the juices being retained in the interior, and the substance is thus softened. Frying presents nearly the same phenomena; but as in this kind of cooking, the meat is cut into thin slices, and as the fire does not immediately act on them, owing to the vessel in which they are fried, it is more equally applied to all the pieces; beside, to prevent those which touch the bottom from soon becoming hard by the action of the heat, a fixed vegetable oil or fat is generally used in frying them. It is proper not to apply too great a degree of heat to the frying pan; otherwise the fat or oil burns and becomes empyreumatic, that is to say, it acquires an acrid and irritating taste and smell, and meat thus fried is not so soluble in the gastric juice. In general, this preparation is not salutary, and fried meats do not digest easily. It frequently occasions griping pains,

and other accidents, even in strong and robust stomachs.

Lastly. The last method of applying heat to aliments is by roasting them. It is proper that every part of the meat be equally subjected to the action of the fire, in order that it be rendered tender throughout, and that the dissipation of the juices be not too great. The fire should not be too violent, nor the meat remain too long exposed to its action; otherwise it becomes dry, acquires a degree of compactness, and is thence rendered difficult to digest. To prevent these effects, it should be roasted in large pieces, so that the condensation which its exterior surface experiences by the action of the fire, may prevent the evaporation of the juices contained in the interior. It is for this purpose that meat which is roasting, is baisted with a fat substance, which has the double advantage of opposing the evaporation, and of preventing the surface from becoming too dry.

Besides the application of fire to which meats are subjected, their nutritive qualities are improved, or they are rendered more agreeable to the taste by the addition of sauces. Sauces or gravies are made of fat or oily substances, and the juices of the meat, to which is added seasonings; it is this which constitutes properly the art of cooking, an art which the French have, perhaps, carried to the highest degree of perfection, but which has become very fatal to man, as happens with the best things, when carried to excess.

It is very important to pay strict attention to the vessels, in which aliments are prepared and served up, when we wish to preserve health, and not to ex-

pose ourselves to the danger of poison. It is desirable, and the cause of humanity requires it, that vessels of copper, lead, and tin, be proscribed as kitchen utensils, and for domestic uses. Such a law would prevent many misfortunes, to which these metals expose those who use them. Copper, in an oxyde and saline state, is a real poison; it exercises so great an electrive attraction upon oxygen, as to decompose water and oxydate it; the least degree of moisture is sufficient to convert it into verdigrise. It is in vain than this effect is attempted to be prevented by tinning it, as it has been fully proved that this means does not always prevent the copper from being oxydated; besides, the tinning is not without danger, for there is no tin, even the purest, which does not contain arsenic; and tin is soluble in a great number of substances, and when one of these remains a short time in a copper vessel lined with tin, the tin is soon dissolved, and the copper left bare.

Tin vessels should be banished from use, since this metal contains arsenic, which we know to be one of the most violent and most dangerous poisons.\* Those of lead should also be rejected, as this metal is very soluble in many liquids, and when in a state of salt or oxyde, is not less dangerous than the two preceding.† It produces that dreadful cholic, known by the

\* Bayen and Charlard found a simple and easy method of detecting the presence of arsenic in tin; it is to dissolve it in muriatic acid; this acid attacks neither copper nor arsenic; hence these metals are precipitated in the form of a black powder. To know the quantity of arsenic, it is necessary to subject this powder to the action of heat; the arsenic volatilizes, and the copper remains; the diminution of the powder gives the weight of the arsenic.

† Copper and lead are among the number of metals that oxydate in the air at any temperature.



name of saturnine, or that of plumbers or painters. The vapor of this metal is sufficient to produce this disease, and those who work in lead are exposed to it. I will observe, by the way, that it has been remarked, that those who work in this metal, and whose constitutions are fortified and hardened by the habit of violent exercise and laborious work, are less subject to this cholic, and resist the fatal impressions of lead better than those who are not.

The interesting observations of Stahl, confirmed by those of De Hean, induced these philosophers to justly recommend, that those who work in lead, should live upon rye bread and bacon, that they should eat in the morning before going to their work; this would be an excellent prophylactic. By taking heavy aliments, they support the digestive energies, and give tone to the organs, and prevent their giving way to the deleterious effects of the miasma of lead. This advice is applicable to all those who work upon metals.

Vessels of sheet iron or tin, whose pewter is purified and entirely deprived of arsenic, might be substituted for copper. Zinc has been proposed, instead of tin, for coating vessels. From the inquiries of Malouin upon this subject, it appears that this coating has the advantage of being more uniformly spread over the copper, and of being harder than tin. It has been objected that the vegetable acids might dissolve this coating, and that salts with a basis of zinc, were not exempt from danger. From a great many experiments instituted by Laplanche, it appears that the salts of zinc taken in the strongest doses, cannot dissolve the aliments prepared in vessels thus coated,

nor are they dangerous. However, earthen vessels, whose glazing is not of dangerous materials, might be still more advantageously used. The earthen vessels now used by the poorer class, are not exempt from danger; their glazing is made with the glass of lead, and dissolves by degrees in fatty substances, and by mixing with the aliments, contaminates them. The white varnish, the base of which is the oxyd of tin, might be substituted for it, and this is not dangerous.

Common earthen ware, which is used by persons in tolerable circumstances, are of a very bad quality, and impart to the aliments that are prepared in them, the most disagreeable smell and taste; they are formed of porous earth, and are badly burnt. The density of the vessels are very different from that of the glazing; they dilate much more than it does, and it of course cracks in many places, so soon as these vessels are exposed to the action of fire; it thence results, that a part of the grease used in cooking passing through these cracks, penetrate the pores of the vessel, and that once penetrated with this substance, it contaminates every substance cooked in it. Besides, this species of earthen ware cannot resist the alternations of heat and cold; they generally break as soon as they experience the impression of heat. Those invented by the celebrated Reaumur, and known by the name of porcelain, by devitrification, might be advantageously substituted. The process of making this ware is very simple and not very expensive; it consists in placing the glass vessel that we wish to convert into porcelain in a burnt earthen vessel, (common broken glass; that of wine bottles succeeds best.)

The glass and its case is filled with a cement composed of sand and gypsum, or plaster of Paris in powder, of equal parts. The whole is then put in a furnace, and left as long as it requires to burn other earthen ware. The glass is found transformed, at the close of the operation, into a kind of porcelain of a milk white color, semi-transparent, so hard as to give fire with the steel, infusible and of a fibrous grain. Much has been done in France, in the art of making the porcelain, which is an object of luxury among the rich. Should not the potteries be employed for the use of the most numerous class of people, and who are not the least useful? Would it not be rendering great service to society, to enable all persons to procure at a small expense, vessels and utensils which would be exempt from the dangers and inconveniences, to which the earthenware daily used are subject? And might not utensils for the kitchen and table, be manufactured of glass in glass houses, and be burnt according to the process of Reaumur? This new art would be of the greatest utility, and would honor the humane government which would encourage it.

## CHAPTER VI.

*On Seasonings.*

MAN, coming from the hands of nature, had only a simple and pure taste. Surrounded by the productions of the earth, of which he was master, he only selected the natural and healthy aliments which it profusely furnished him, and he knew no other seasoning than an appetite. But human societies having become numerous, the necessity of providing himself with seasonings, and of preserving animal meat, made him have recourse to condiments. And condiments have excited glutony, and introduced insensibly, that flattering and pernicious art of altering aliments, and changing their nature, by mixing the most irritating and heating substances with them, which a corrupt luxury seeks in the most remote climates, and which are an inexhaustible source of diseases. I do not, however, pretend to condemn all kinds of seasonings; for in addition to some of them having become necessary in our present state, there are others which are useful to health, by correcting and improving certain aliments.

Seasonings properly called, are not alimentary substances; they are acrid and irritating, and do not contain any thing that can be converted into our substance. But custom has prevailed in calling by the name of seasonings, all substances which are mixed with aliments, whether to correct their qualities or increase their taste; of this number are several alimentary substances, such as butter, cream, oil, sugar, &c.

Seasonings in general, may be divided into exotic and indigenous. The first are brought to us from foreign countries, and the others grows in Europe.

## ARTICLE I.

*Exotic Seasonings.\**

The exotic seasonings, known under the name of spices, are aromatic, and grow in very warm climates; they contain a specific oil, which is heavier than water, slightly volatile, very acrid, even a rubefacient; for when applied to and left on the skin for some time, they redden and inflame it. These seasonings are very stimulating, and the irritation which they produce in the stomach is propagated throughout the system. They sensibly augment the contractions of the heart and arteries, and increase the heat of the body. Their use is not salutary to sanguine persons, nor to the plethoric, bilious, atrabilious, young persons, nervous constitutions, hysterical persons, nor to those who have a feeble and delicate breast. Taken moderately, they are useful to the pituitous and to effeminate persons, because their excitement is necessary to them. They are also proper in long continued warm weather, as well as in warm countries, and especially in those where they grow. The relaxation and debility of the organs, the diversion of the energies, which abandon the centre to constantly radiate to the circumference; render them in some measure indispensable in these

\* The division of this chapter, will not apply to the people of the United States. Some of those called exotic are indigenous in this country, and *vice versa*. But this does not effect practical facts, which is more immediately our object.—T<sub>r</sub>.



circumstances. Their principal effects are to aid digestion; to recall a portion of the energies towards the centre; and thus to re-establish the equilibrium between the epigastric organs and the superficies; the heat of the weather causing an increase of action towards the skin, at the expense of the other parts of the system.

The other spices are furnished by the *verticillate* or *umbelliferous* plants of Europe. Their oil is not so heavy, and is less acrid, but more volatile. It is the oil contained in spices which makes them stimulating, aromatic, and antiseptic. By exciting the paralytic action of the *primæ viæ*, they promote the expulsion of wind. Their use should be very moderate, otherwise they are dangerous. They have an active effect on the stomach, and augment in a pernicious manner, the action of the whole system, which they finally destroy.

1. Cinnamon, (*cinnamomum*; *laurus cinnamomum*, *Lin.*) It is the bark of the cinnamon tree; a small tree which resembles the laurel, and which is very common in the Isle of Ceylon. It has a sweet and aromatic odor, an acrid taste, and is slightly astringent. This bark holds a prominent rank among the agreeable seasonings. It is a cordial and stomachic; but when its use is continued too long it disposes, as well as the other seasonings of this genus, to sthenic diseases.

2. Ginger, (*zinziber*) the root of the amomum of India, (*amomum zinziber*, *Lin.*) originally of China, Malabar, and the Isle of Ceylon. It is of an agreeable odor, and a pungent taste. The ginger of China is reputed the best, but we only use that which is

brought from the islands of the Antilles, where it is cultivated. From the observations of Galen, this seasoning is less stimulating than that of pepper, and is by no means inferior, in respect to its qualities, to that of cinnamon. The inhabitants of India mix ginger with all their aliments. The Madagascarians, Hottentots, and Philipinians eat it green, in salad. It is used at Cayenne as raddishes, after having been washed. The Brazilians use it as a masticatory, and prefer it in sugar, to excite an appetite; ginger is a warm stomachic which aids digestion. It also powerfully excites to love; we should avoid the use of it when we are warm, and when the blood is in a ferment, or in too large a quantity.

3. Cloves, (*caryophilli aromatici*) are the unblown buds of the *caryophilata*, (*caryophyllus aromaticus*, *Lin.*) which is a tree of India, resembling the laurel, and which grows in the Mallaccas, or Spice islands, situated near the equator. Cloves have a very agreeable aromatic odor, and are one of the seasonings most used; there is no ragout, sauce, and but few dishes or spirituous liquors, into which they do not enter. They possess the same virtues as the other seasonings of this genus.

4. Pepper, (*piper*) the fruit of a tree which grows in India, and of which there exists several species, (*piper longum*, *Lin.* and *piper nigrum*, *Lin.*) It is a seasoning which is more in use than any other, in the kitchens of both poor and rich. It singularly aids digestion, but should only be used moderately, for it is very irritating and heating. Pepper is particularly proper for persons of a weak stomach, and those who are subject to griping pains. Celsus attributes to it

the property of augmenting the urine, and of destroying worms. It is an aphrodisiacum, that is to say, it increases the ardor for venereal pleasures. It has cured some cases of intermittent fever.

5. Nutmegs, (*nux moschata*; *myristica officinalis*, *Lin.*) The fruit of a tree of the East Indies, which is as large as a pear tree; it is of the size of a walnut, and is covered with a particular enveloping called mace, or flower of nutmeg. The nutmeg has an agreeable odor, and a slightly acrid but sweet taste. It is one of the mildest and least irritating seasonings, and communicates to the aliments a very agreeable taste. Nutmegs are eaten preserved; but they should not be used in too large a quantity, nor habitually, for they have been observed to affect the nerves, and cause soporiferous diseases. Mace has a more penetrating odor, and a more acrid taste than the nutmeg; it possesses the same virtues, and is not less dangerous when used immoderately.

The Romans formerly made great use of asafoetida, (*ferula asafoetida*, *Lin.*) as a seasoning; the Cyrenians and the Greeks, were so fond of it that they called it the *meat of the gods*. It is still used as such in the countries where it grows. They pretend that its odor is not so disagreeable as when transported into our climates. It is only employed in Europe, as a medicine to dissipate vapors, and to cure the hysterics; and in fact, this substance is one of the most efficacious medicines of this genus, owing to the strong and extremely fetid odor which it diffuses.

6. Sugar, (*saccharum*) is a substance very abundantly diffused in the vegetable kingdom. Marggraff has extracted it in large quantities from many

pot-herbs, from a great number of farinaceous plants still green, and even from some trees. His process consists in digesting the vegetables rasped and finely divided in alcohol, which has the property of dissolving the sugar and of separating it from the extract which it precipitates.

The inhabitants of Canada extract sugar from a species of maple, (*acer saccharinum*, *Lin.*) by incisions which they make in the body of the tree. The Indians obtain it from the pith of the *bamboo*, and the South Americans, from the sugar cane, (*arundo saccharifera*; *saccharum officinale*, *Lin.*) from recent experiments, very great quantities, and at little expense, may be obtained from the beat. It appears that the ancients knew a sugar, which was brought from Arabia. This sugar is called by Archigenes, *Indian salt*.

Sugar appears to be the basis of all nutritive substances; it is met with in all these used as aliments. Moreover, it is almost the only nourishment which some nations use. The Cochin Chinese eat sugar instead of bread. The Maroon negroes live, most frequently, only upon the sugar canes. There have been examples of some persons who have lived almost entirely upon sugar for several years.

Although sugar be a very nourishing substance, it is nevertheless, most frequently employed as a seasoning. It constitutes the basis of syrups and the greater part of sweet meats; it is used upon tables to correct the sourness of fruits and juices, and the bitterness of coffee; it enters into the composition of a great number of pharmaceutical preparations. Sugar is an oxyd with two basis, formed of eight parts of hydrogen,



twenty-eight of carbone, and sixty-four of oxygen. It is converted into the oxalic acid, and super-oxygenated by means of the nitric acid; there is also produced in this operation the malic acid, which is a little more oxygenated; lastly, by oxygenating the sugar still more, it is converted into the acetous acid, (*vinegar*.) Sugar is very fermentable; it is the only body which is susceptible of being transformed into alcohol. It aids digestion in a singular manner, in consequence of its *fermentability*, and of the solubility which it communicates to the aliments with which it is mixed. It is united to the vegetables that are preserved; but the boiling to which they are subjected to incorporate them, dissipates their volatile and active particles, so that the greater part of vegetables thus preserved, are entirely deprived of their aroma. It is particularly fruits that are preserved; the sugar preserves them from fermenting: but it does not destroy their acescency; which is the reason they remain disposed to contract the acid fermentation in the stomach.

Sugar is particularly proper for old persons, either as an aliment, or as a seasoning. That it is heating as the vulgar think is erroneous. Observation has taught us that its habitual use is injurious to bilious constitutions, to the asthmatic, and among children, in whom it promotes the generation of worms, by debilitating the tone of the *primæ viæ*.\*

\* *Promotes the generation of worms in children by debilitating the tone of the primæ viæ.* This opinion is nearly, or perhaps entirely, abandoned by the physicians of this country; indeed many of them contend that it is a valuable remedy in these cases. From many experiments that have been tried on worms out of the system, it has been proved that sugar destroys them sooner than almost any other article.—*Tr.*



## ARTICLE II.

*Of indigenous seasonings.*

1. Common salt, (*sal culinare*) muriat of soda; it is very abundantly diffused in the mineral kingdom. salt is obtained from the sea waters and from certain salt fountains. There exists in certain places, as in Poland, mines known by the name of *sel gemme*. It appears that nature has destined this substance for the use of man, for there are no people who do not use it, and who do not mix it with their aliments.

Salt is the most common and most useful seasoning; it excites the action of the stomach by its stimulus, gives a taste to insipid aliments; it occasions thirst and dryness, produces cutaneous diseases, and disposes to scurvy. The flesh of quadrupeds and fish, with which much salt is mixed to preserve them, harden, become more difficult to cook, and digest with difficulty. The habitual use of these aliments, contracts in the blood a muriatic acrimony, which soon degenerates into scurvy. Salt possesses an anti-putred virtue when mixed in large quantities with meat, which we wish to preserve; but it accelerates their putrefaction, when employed in a small proportion.

2. Vinegar, (*acetum*) is the production of the acetous or acid fermentation, or rather the oxygenation of wine; its goodness depends in some measure upon the goodness of the wine. Vinegar is one of the seasonings most used; it is one of the most necessary ingredients to salads, and serves to pickle many vegetables; it is also used to season viands. Vinegar is

cooling and anti-septic, and it is employed in divers manners to preserve the flesh of animals from putrefying; those preserved in this acid, are never penetrated with it to such a degree, as to become less easy to digest, nor to lose much of their nutritive qualities; this seasoning is very suitable to an animal regimen and to human nature; it is particularly useful to the sanguine, the bilious, and to those who are fat; it is, on the contrary, injurious to old persons, to the meagre, and to those who are tormented with a cough, and to hysterical women.

Vinegar as well as the other vegetable acids, excites the action of the stomach, augments the appetite, and aids digestion; it appears even to prevent, rather than promote the acidity of vegetables. It is essential to observe that the acids of the vegetable kingdom taken to excess, finally enervate the stomach, and throw it into a state of atony; this is the reason why they are injurious to feeble and pituitous persons, to meagre and cachetic, and generally in all states depending on debility and exhaustion, which are characterized by a diminution of the animal heat, and a slowness of the actions.

3. Verjuice, (*omphacium*) is the expressed juice of grapes, which are green and in a crude state; it differs but little from vinegar; it has the advantages and the inconveniences of this acid, only it is more astringent, and there is less to fear from an excessive use of it.

4. Lemons, (*limones*) are used as a condiment, as well as citrons and oranges; their effects upon the animal economy are nearly similar to those of vinegar, only they are more cooling and temperate; vine-

gar does not possess these qualities in so eminent a degree, owing to its containing a certain quantity of alcohol, which the fermentation has not converted into *acid*.

5. Capers, (*capparis; capparis spinosa, Lin.*) are the buds of a plant, the caper tree, which grows in Asia, Africa, and southern Europe; they are preserved in vinegar, by this means they become very acrid, but are not nourishing; consequently, they are employed the same as the girkin or little cucumber, only as a condiment, and to excite an appetite. Capers are aperitive and anti-scorbutic. Experience has not yet established their presumed efficacy in affections of the spleen.

6. Cummin, (*cuminum; cuminum cymimum, Lin.*) an annual *umbelliferous* plant, originally of Egypt, which is cultivated in the island of Malta, under the name of *acerb anise*. Its grain which is very warm and aromatic, is employed in making cheese; the Germans mix it with salt in the dough of bread to excite thirst; it, as well as the caraway, (*carum carvi, Lin.*) is a carminative, and are one of the four large warm seeds. Pigeons are very fond of it; it is a bait that attracts them in flocks.

Fennel, (*fœniculum; anethum fœniculum, Lin.*) an evergreen and aromatic plant, of which two species are distinguished, the common fennel which grows without cultivation, and the sweet fennel, which is the common, rendered sweet by culture. The leaves of the fennel are used in seasonings, its young whitish twigs are eaten as cellery, its grains as well as those of the cummin, contains much volatile oil; it is one of the four large warm seeds; it aids digestion, dissi-

pates wind, and is in this respect very useful to asthmatic persons.

8. Common laurel, (*laurus vulgarus*; *laurus nobilis*, *Lin.*) a small tree which is always green, originally from Asia, and naturalized in France; its leaves, as well as those of other aromatic plants, such as the wild thyme, (*thymus serpyllum*, *Lin.*) the sage, (*salvia officinalis*, *Lin.*) are used as condiments to give a taste to viands; they are odoriferous, of an acrid taste, slightly bitter and astringent; they contain a volatile oil, which is obtained by distillation. The laurel was much celebrated among the ancients; it was the recompense of valor and of talents, as the oak was that of civic virtues; they formerly crowned those who obtained degrees in the universities of France with laurel branches loaded with berries; it even appears that the name of bachelors (*baccalaurei*) is derived from *baccæ lauri*.

9. *Tetradynamia*. Some acrid plants of this class, especially mustard and horse-raddish, are used as condiments; they stimulate the alimentary canal, and thus aid digestion, by causing the energies to converge towards the digestive organ, and by promoting the solution of the aliments in the gastric juice; these substances augment the secretion of the perspirable humor and of the urine; they are anti-scorbutic, and their moderate use is very salutary with meats, especially with those which are much *animalized*.

10. *Alliacia*. Plants of this class have much affinity to the preceding by their acrimony and their other qualities. The mildest, as the onion and leek, contain a certain quantity of nutritive matter; they, as well as tetradynamia, provoke the urine and cause

transpiration and sweat, they are anti-scorbutics, and are advantageously used with meats, and especially with fish.

11. Animal fat and vegetable fixed oils. These differ from one another only in the animal fat containing a certain quantity of gelatin, and frequently the juice of the meat, whereas in the fixed oils the constituent principles, hydrogen and carbon, which are also those of animal fat, are combined with mucus. These substances possess the same properties, with this difference, the fat of the animal is more nourishing. But we only consider them as seasonings. Among the fixed oils, that of the olive merits a preference, when it is well selected, to wit: when it is fresh, sweet, and of an agreeable taste. In general old oils, as well as old fat, are unwholesome and have a disagreeable taste; those that have experienced the action of fire are empyreumatic, that is to say, of a strong and penetrating odor, and of an acrid and caustic taste; they are pernicious to persons of a bilious constitution, to those who have a dry and irritable fibre, who are subject to breast complaints, or who have a disposition to cough, and a difficulty of respiration.

12. Butter and Cream. Butter is the fat and oily part of milk, whose particles are interspersed between the serous and cheesy parts of this fluid, to which they give a dead white appearance. The cream is separated by a rapid motion; it is a mixture of cheese and butter, which being specifically lighter than the other parts of milk, separate from them spontaneously by standing, and collects, at its surface, whence it is skimmed to obtain butter.



The following are the designating qualities of good butter: it must be fresh, yellowish, of an agreeable and sweet taste, and of a firm consistence; it owes its concrete form to the presence of oxygen; that which is salted (firkin butter) is of an inferior quality, and the old is unwholesome; it is also bad when melted, the same as oil and animal fat; it acquires in those circumstances an acrimony and rancidity, which are owing to the super-oxygenation, which disturb and render digestion painful, and occasion nidorous and heating sensations. Butter and rancid oils may, however, be separated from their acid, which is the production of this super-oxygenation, and re-established to a certain degree by keeping them in water or alcohol for some time, both of which have the property of separating them from this acid, and of dissolving them. Cream is a very mild and very agreeable seasoning, it is employed as such in many countries, especially in those where milk is common; to be good, it should be fresh, white, and of a certain consistence, mild, and agreeable to the taste.

13. Honey, (*mel*) does not differ essentially from sugar. Bees extract it from the nectar of flowers, from which it is transpired in the form of a fluid. Honey is very nourishing, and relaxes the bowels; it has served as the almost entire nourishment of many hermits, who have lived to a great age; it was frequently employed by the ancients as a seasoning. Since sugar has become common, it is much less used. Good honey ought to be fresh, heavy, mild, and white, collected in the spring, and of a sweet odor. When old it has a disagreeable bitter taste. Its taste is influenced by the species of plant from which the bee

gathers it; the aromatic plants furnish the most delicious. Honey is useful to old people, children, women, and to the pituitous; it is pernicious to the bilious, as well as all sweet substances, which, as has been well observed by Hippocrates, is promptly converted into bile, in temperaments of this nature. There are persons in whom honey produces flatus and cholic.

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## CHAPTER VII.

### *Of Fermented Drinks.*

ALL the liquids which have the property of inebriating, in consequence of the alcohol which they contain, and which is the production of the vinous fermentation, are in general called vinous or fermented drinks; such are the wine of the grape, cider, perry, vinous mead, brandy,\* and alcohol. The preference is justly given to the wine of the grape, it is to the other fermented drinks, what bread made of wheat flour, is to that made of the other *gramina*; it is superior to all others, both in taste and in its qualities. Sugar is the only substance that can be converted into alcohol, and no article which does not contain it, is susceptible of passing into the vinous fermentation;

\* In passing through this work the reader will find the word brandy almost generally used where any reference is made to distilled spirits. However, most of the observations made relative to brandy are applicable to those of other spiritous liquors. The word brandy may be considered a general term in France, and that of whiskey in our country.—*Tr.*

but in order to excite this fermentation, it is necessary to mix the sugar with a certain quantity of water, and to incorporate it with some other vegetable or animal substance, as with the extractive principle, feculæ, a salt, &c.

Sugar is so abundantly diffused in vegetable and animal substances, that there are but few which are not capable of undergoing the vinous fermentation, and of giving alcohol. All sweet fruits when bruised soon contract it, after experiencing a heat above the fiftieth degree of Reaumur. The seed of the *gramina*, and especially of barley, the germination of which developes the matter of sugar. Honey and sugar mixed in water easily runs into this species of fermentation, when they are subject to the action of this cause. Moreover, milk itself is susceptible of being transformed into wine. The Tartars have scarcely any other inebriating drink, than that which they make with the milk of the mare, the fermentation of which they produce by the process which I have indicated when speaking of milk.

The phenomena which accompany the vinous fermentation, are the following: 1. A motion is excited in the mass, which insensibly increases, and the volume of the liquor augments in proportion to this motion. 2. The liquor becomes turbid at the same time that its temperature increases, and this is sometimes increased eighteen degrees. 3. The most solid parts ascend and float on the surface. 4. A great quantity of carbonic acid is disengaged, which dissipates with it a certain quantity of water. It is this acid which forms the abundant scum or froth, which we remark in liquor in a state of fermentation; it ex-

tinguishes the light which is put in contact with it, and suffocates those who breathe it. These phenomena take place as long as the liquor preserves its sweetness, and do not cease until it has acquired a spirituous and an inebriating quality. However, the fermentation continues, but in a much slower and less active manner, which is absolutely necessary to the perfecting of the wine.

Sugar is composed, according to the experiments of the Newton of chemistry, the unfortunate Lavoisier, (whom a hord of miscreants, composing a revolutionary tribunal, had put to death for the punishment of the crime of being virtuous, and of having been in some measure born a chemist,) of eight parts of hydrogen, sixty-four of oxygen, and of twenty-eight of carbon. These principles exist in it in a state of equilibrium, and form binary combinations from them. At first the water is decomposed, and a great part of its oxygen communicating with the carbon of the sugar, burns it and converts it into carbonic acid; at the same time the hydrogen of the water communicates with the sugar, and combining with it, forms alcohol. Hence, this is nothing but the sugar deprived of a certain quantity of carbon, and combined with a greater proportion of hydrogen; consequently, if alcohol be passed through a red hot tube of glass or porcelain, it is decomposed into water, hydrogen gas, and carbonic acid.

Wine is composed of water, alcohol, tartar, of an aroma, which differs according to the species of wine, and of an extracto-resinous coloring substance.

We readily conceive that wines differ in their quality, not only in relation to the species of grapes, and



the nature of the ground, but also to the divers preparations of the principles, and in the manner in which the fermentation is conducted. This liquor has been known as a drink from time immemorial, there are none of the savage nations, even, who have not found means of making some inebriating drink. The Moxes, the most barbarous nation of America, make a very strong liquor with rotten roots, which they infuse in water. Other savage nations prepare an unpleasant liquor, called *chicha*, from maize. This liquor contains much spirit, and the savages often get drunk with it.

Wine is a nourishing drink, and one which is as agreeable as it is salutary, when of a good quality, and used in moderation. Good wine has a proper color, is limpid, has a pleasant smell and taste, and its moderate use produces no inconvenience. That which is adulterated is very dangerous, in fact, it is a real poison, which shortens the days of those who drink it.

If we observe the effects that wine produces upon man, we shall see that they are very different, according to the divers constitutions. There are those who habitually drink it, even in large quantities, without experiencing any inconvenience, and who attain to a great age. However, the greater number of drinkers do not live long, they die at an early age, under a load of infirmities. The safest method then is to take habitually but a small quantity of wine, and even to mix that with water. This advice should be rigorously attended to by those whose constitutions are not naturally congenial to this drink.

One may be sure that the use of wine is pernicious, and it should be absolutely interdicted, when it pro-



duces the following effects: an offensive breath, acidity, and slight pains in the head; and when after having drank a greater quantity of it than usual, it occasions insensibility, nausea, intoxication, especially when this is accompanied with fretfulness, gloominess, quarrelsomeness, and passion.

Men upon whom wine produces these effects, and who persist in the use of it, die miserably about the fiftieth year of age. Wine taken immoderately, not only irritates the nervous system excessively, dries and renders the solids rigid and decomposes the humors, but it also affects in a particular manner, the abdominal viscera, injures the organization of the brain, and weakens the mental functions. The most common disease among drinkers, is the dropsy; to which morbid affections of the liver, spleen, and misentery give rise; all the viscera are in a state of desiccation and aridity, as is proved by opening the deceased who have been faithful worshippers of Bacchus.

Spirituous liquors made with brandy, and the spirits of wine, are still more pernicious; and their effects are much more deleterious, when used habitually and to excess. These liquors, which are so much abused in our day, are real poisons, which do not contribute a little to the destruction of the human species, in the flower of age.

The first effect of wine and strong liquors taken immoderately, is to excite strong irritation in the bowels, to produce violent spasms in them, and to concentrate the energies there to such a degree, as to deprive the exterior organ almost entirely of its healthy action.

If we examine man laboring under the intoxicating effects of wine, we shall find that his head is affected, that he is in a state of delirium and sleepiness; he cannot support himself, he staggers, and the body is frequently cold; he loses all sensibility, cold and heat make no impression on him; he is tormented with wind, hiccough, tremor, &c.

All these symptoms are owing to a concentration of action, which has degenerated into a spasm in the stomach and intestines. They do not depend, as the Boerhaavians pretend, upon the spirituous parts of the wine mixing with the blood, being rarefied so as to compress the brain, and prevent the influence of the animal spirits.

Vomiting relieving them is a proof that they are only caused by the spasm of the stomach and intestines which irradiates to the brain. It is also observed that wines adulterated by irritating drugs, inebriate much sooner and are much more pernicious than those which are pure and of a good quality.

This theory is conformable to the observations of Hippocrates, who says, (Aph. v. sect. 4.) "If a drunken man suddenly loses the power of speech, he dies in convulsions, unless a fever supervenes, and he recovers the power of speech as soon as he vomits." From this observation, the fever prevents the fatal consequences of drunkenness, but according to the Boerhaavian system, a fever by augmenting the rarefaction of the blood, so far from being useful, would on the contrary, increase the dangers of intoxication, if this really depended upon the compression of the brain, as they pretended. However, and contrary to their opinion, this fever is salutary; nature excites it

to destroy the spasm of the bowels, and to reflect their energy towards the circumference; it is in this sense that we ought to interpret the following aphorisms. "It is better that a fever suddenly appear in convulsions, than those in a fever." (Aph. xxvi. sect. 2.) "The fever that takes place in convulsions or titanus, causes these affections to cease," (Aph. lvii. sect. 4.) Those who digest wine well do not experience, or at least in but a slight degree, the symptoms which I have enumerated above.

Their intoxication renders them witty, talkative, and gay; they rarely perish with dropsy and obstructions: notwithstanding this, wine sometimes produces pernicious effects in their constitutions. Drunkards of this class live longer than those of whom I have just spoken, but their temperament is altered, and generally becomes depraved about the age of sixty years, and in old age they are subject to paralysis, mental derangement, apoplexy, and other diseases of this kind.

In general, strong liquors taken habitually in too large a quantity, consume the vital energies, and bring on premature old age: they support in the system, a habitual fever, which exhausts, inflames, and disposes to serious diseases. It is commonly supposed that they aid digestion; but this is only true in certain cases, as when the digestive organs are in a state of debility and relaxation, so that they only digest with difficulty, or when the eccentric force morbidly predominates so much as to leave these organs in an almost total state of inertia. A small quantity of liquor taken in such circumstances, usefully increases the tone, and causes the energies to converge towards the

stomach: but if daily use be made of liquors, they finally produce a radical enervation in the *primæ viæ*. In general, all means which make the stomach a permanent centre of action, terminate by destroying its energies and its activity.

Such are briefly, the evils which the man prepares for himself, who gives up passionately, to the use of spirituous drinks. I shall, doubtless, not be accused of exaggeration, for there are but few persons who have not witnessed these effects. This is no doubt, the picture of these diseases which has induced philosophers to suppose, that an abstemious life is the only one suitable for man. In fact, our primogenitors lived to a great age, and had no knowledge of the use of wine or strong liquors. Nature, say the Pythagorians, has profusely furnished water to all men, and in every country: she has rendered it agreeable to all palates, whereas she has not produced fermented liquors in any part of the world; they are the productions of art. But is it demonstrated that the life of the first inhabitants of the world, was not so long as they would have been, because they did not make use of these drinks? and are there not a multitude of other causes, that have produced, as I have said at the commencement of this work, a greater number of diseases and infirmities, and which have shortened the duration of man's existence?

May we not oppose to the partisans of an abstemious life, the natural taste which every nation has for vinous drinks? Is not an universal appetite the effect of instinct, which leads man to the use of salutary things for his preservation and happiness? For nature never deceives him. It is very true, that she does not pro-



duce fermented drinks in any part of the world; neither does she produce bread in any part of it; and would this be a reason for interdicting its use? Besides, in admitting that our primogenitors had no knowledge of vinous drinks, is it not certain that we, influenced by different circumstances, and having almost entirely degenerated from their strength and vigor, render these drinks necessary to us; from our manners, and the feeble constitutions that we possess? The use of wine is good in itself, and it is too useful to man, to be condemned so severely. It should be used moderately: children, young people, women, the sanguine, bilious, and atrabilious, ought to drink but little of it, as well as those whose nervous system is very irritable and very sensible. It may be given in larger quantities to men who are much fatigued, to old persons, to the pituitous, and to the infirm, during damp weather, and in wet and marshy places. Taken moderately, it nourishes, increases the energies, augments the force of the vital principle, accelerates the progressive motion of the blood and humors, determines the action from the centre to the circumference, and produces transpiration; in a word, wine possesses all the qualities proper to maintain health, and to prevent many diseases.

The body is not alone the object of the salutary virtues of wine; the mind also experiences its vivifying influence. Homer, sometimes animated his immortal songs by the use of this precious liquor: Eschylus never put off the buskin except when he was warmed with wine, and Lampridices never showed more genius than when he had drank of this enlivening juice. Finally, Ennius, Cato, Rabelais, and a great number of



others,\* found in this drink of the gods, that gaiety, and that brilliancy which smoothe the forehead of wisdom, and electrifies the imagination. The use of wine is blamed then without reason; I say more, it is in this drink, that we find the true remedy for melancholy and chagrin.

“When any misfortune happens to an European,” says Montesquieu;† “he has no other resource than the reading of a philosopher, called Seneca; but the Asiatics, more wise than they, and in this respect, better philosophers, take some drink capable of rendering man gay, and of dissipating the remembrance of his troubles. It is a folly to endeavor to soothe an evil by the consideration that we are born miserable: It were much better to raise the mind above these reflections, and to treat man as a sensible, rather than as a rational being.”

We should then only interdict the abuse, and not the use of wine; we should permit it to be drank, but not to intoxication. In addition to the physical evils that drunkenness produces, this gross and brutal vice also extends its fatal effects to the mind, and deprives it of its vigor and energy. It is an infraction upon the law of nature which forbids man to alienate his reason. In warm countries, the excess of wine renders one furious, and in cold ones occasion stupidity. In general, the use of wine ought to be moderated by the crystal of the fountain, and as the good Plutarch has said, “we should calm the ardor of Bacchus, by the commerce of the nymphs.”

\* It is said, that Blackstone wrote his Commentaries, which will exist as long as the system which they explain, with a bottle of port wine on his table.—*Ti.*

† Letters, Pers. let. lxxi.

It is not only the excess of wine that renders this drink unwholesome and dangerous, its adulteration, especially with semi-vitreous oxyd of lead, (*litharge*) is still more injurious and destructive. Some merchants use this ingredient to sweeten wines which turn sour; and, in fact, this substance has the property of neutralizing the acetous acid that is developed by fermentation, and of forming with it a salt of a sweetish taste, which does not alter the color of wine, and which prevents the progress of acidification; this adulteration is exceedingly pernicious; it frequently gives rise to the most serious accidents, and especially to that terrible cholic, known by the name of *saturnine cholic*, *cholic of lead*, or *of workers in lead*.

This alteration is discovered by means of the alkaline sulphur, or the sulphat of lime in a liquid state, the preparation of which consists in mixing equal parts of potash, or lime and sulphur; this mixture is put in a crucible and melted promptly, to prevent the dissipation and the combustion of the sulphur. It is not necessary to apply a very great heat, because the sulphur, which is very fusible, facilitates the fusion of the potash by uniting with it; when this mixture is entirely melted, it is poured upon a stone, which has been previously oiled; the sulphur concretes in a brownish substance. When we wish to preserve it dry and solid, it is necessary to break it immediately into small pieces, and put it while warm in a well dried bottle, which is to be well stopped, because it is very deliquescent. When we wish to use it to try wine, in which we suspect lead, we must dissolve a small quantity of this sulphur in water, and take a

clean glass, which is to be half filled with wine, in which some drops of this solution are to be poured; when the wine contains lead, it turns yellow immediately, then becomes thick and brown, and afterwards forms a brown or blackish precipitate. Wine which has not been adulterated by the semi-vitreous oxyd of lead, turns pale, and does not contract a deep color.

This substance may also be used to test other substances, in which we suspect a similar adulteration. Butter, says Gaubius, that has been adulterated by lithrage, turns yellow, then blackish, and contracts afterwards a mud color.

However, this test and many others are not always certain, and may lead us into error; the most sure method to discover the adulteration of substances by lead, is to evaporate them, and afterwards to subject them to a strong fire in a crucible. When they contain lead, after the operation, we find a small lump of this metal, at the bottom of the crucible.

The best remedies for accidents produced by lead, are sulphurs and warm sulphureous waters.

Some wine merchants are in the habit of dissolving a certain quantity of alum in their wines to brighten the colors of them, and to prevent their turning sour. This method may be made dangerous when the alum is used in large quantities. The principal effects of wine thus adulterated, are to constipate the bowels, to produce pains in the stomach, and when the use of it is continued, to cause obstructions and miasma. This fraud may be discovered by throwing some drops of the nitrat of mercury in the wine. When it contains

alum, this is soon decomposed; the sulphat of mercury and the nitrat of alum are formed. Other means may also be employed; alkalies, lime, barytes, &c. have the property of decomposing alum.

There is a very great difference among wines from their color and consistence, taste and perfume, age and the soil in which the grapes grow.

1. There are white, red, pale, and yellow wines. White wines are generally weak and thin, not so heating and less inebriating than others, they are also nourishing, and augment the secretion of urine: *ad vesicam vina alba magis penetrant, urinasque provocant.* (Hipp. de vict. rat. in acut.) This is the reason they are the most suitable for the sanguine, bilious, and studious men. Their habitual use is, however, injurious to the organs of digestion, and bring on fits of the gout in those who are subject to the disease. These wines are not very nourishing: *vina alba exiguum præbent corpori alimentum.* (Galen.) For this reason the use of them is properly recommended to corpulent persons.

Red wines do not pass off so soon as the preceding; they contain a greater proportion of the matter of sugar, and more tartar, owing to which they are more nourishing, and repair the energies more than the others; they are stomachics, and proper, especially for strong and robust men, as well as those who have a lax texture of body, and sweat easily.

Pale or claret wines, (*vina fulva*) of Hippocrates, as well as the grey wines, hold a middle rank between the white and red wines; they are very salubrious, digest well, and are particularly useful to weak persons, and to those who take but little exercise: their

copious use occasions pains of the head, and attacks of the nerves.

Yellow wines are the most heating of all wines; they are drying and injurious to the brain and nerves. The wine of *Crete*, or of *Malvoizie*, those of the *Rhine*, and many of those of *France*, are of this kind.

2. Wines differ as to consistence; some are thick, others thin, and lastly, some are of a middle consistence. Thick wines contain much sugar and tartar; they are very nourishing and strengthening, but they do not digest easily, and are only proper for vigorous persons, and for those who are habitually engaged in laborious work. Limpid or thin wines are less nourishing, but digest better; their use is more proper for studious men, and for those who lead a sedentary life. Wines of a middle consistence partake of the qualities of both these; they are the most generally used, and serve as drink to the majority of persons, who are rich or in easy circumstances.

3. Wines are sweet, sour, sharp, or poignant. The first are known by the name of sweet wines; they contain a great quantity of sugar and alcohol. All the art of making these wines consists in subjecting them to the vinous fermentation, *must*, which shall contain so much sugar, that a good deal will remain, after a good and full fermentation.

In countries sufficiently warm for the sweetest species of grapes to become perfectly ripe, as for example, for the muscandine; the *must* of the grapes naturally makes a sweet wine; but to give this wine more strength and sweetness, the grapes are exposed to the sun, previous to expressing the juice, in order to con-



concentrate it. In certain places they concentrate the must of the grapes by fire, immediately after gathering them, and previous to the commencement of the fermentation, until it has acquired a syrup like consistence; the sweet wine that results from it is called boiled wine, (*vina cocta*;) the ancients mixed aromatic substances with it. We are induced to believe that the wines which they called *vina myrrhina*, were those rendered aromatic by myrrh. These different processes, provided the heat does not surpass that of boiling water, do not change, or at least sensibly, the combinations of the principles of the wine; they only dissipate the superabundant water of vegetation, and thus concentrate the matter of sugar.

Sweet wines are very nourishing and fortifying; they keep the bowels open, are friendly to the lungs, and promote expectoration; they are, consequently, proper for meagre persons, and those who are subject to cough.

There is another species of sweet wine called rough wine, that is nothing but the must of the grapes, which has only undergone a slight degree of fermentation, owing to its being stopped in the first stage; this wine is very similar to the must; it is turbid, and has a sweet taste; it contains nearly all its sugar, that has been but slightly altered; it is laxative and flatulent; it excites thirst, and is not proper for the bilious, for those who have obstructions, nor those who are affected with intermittent fevers.

Acid or sour wines are those which contain a certain quantity of vinegar, which forms when the fermentation is conducted badly and in a precipitate manner, or when it has been too long supported; for

when the fermentation has gone through its different stages in a proper manner, the wine is only converted into vinegar by age. These wines are not nourishing, they produce flatulency, irritate the stomach and intestines, and cause griping pains; those that tend to acidity occasion griping pains, and cause cholics and diarrhea.

The *acerb* wines, called also green wines, are made of grapes that are not sufficiently ripe, which happens in cold or rainy years, or of which the fermentation has been too slow. These wines are astringent and do not contain much spirit; they are disagreeable to the taste, digest with difficulty, and are not nourishing; they constipate the bowels, produce flatulency and griping pains; in short, they are of a very bad quality. Maupin has proposed proper means to meliorate these wines, and to diminish their roughness. They consist in general in either concentrating the must by evaporation, or in making the wine ferment more rapidly and more completely, by boiling a part of the must in kettles, which is to be introduced to the bottom of the cask, with a long pipe or tunnel whilst boiling hot: then the casks or tubs are to be covered, and a high degree of heat supported, in the place, where the fermentation is carried on by stoves. Experience has proved the value of this process; however, there is a more proper and better method of improving green wines, which is to add to the must, that is not sweet enough, the necessary quantity of sugar.

Pungent wines are those the spirit of which is united with a slightly acrid, bitter principle, and which agreeably stimulate the palate and tongue. These

wines are very inebriating, and are injurious to the sanguine, the bilious, and to young and old persons; they are, on the contrary, useful to the pituitous, whose fibres they render more solid; they constipate the bowels, obstruct expectoration, and occasion melancholy, and unpleasant dreams.

4. Wines differ in relation to their aroma. Good wines have a sweet perfume, similar to that of raspberries; they soon repair the energies, and aid the digestion of aliments, and in this respect are very proper for old persons, also for those who are feeble and languishing; but they are more inebriating and more heating than other wines, in consequence of which they should be used moderately. Those that exhale a disagreeable odor, either owing to their being injured by the casks, or by some drugs being mixed with them, are pernicious, and ought to be rejected from use. Sulphur wines, that may be known by the odor of sulphur which they give out, are unwholesome, in consequence of the sulphureous acid that they contain; such are the most of the white wines of Germany, to which sulphur is added for the purpose of preserving them; by this process the fermentation is arrested, and the sugar is further *alcoholized*, but slowly and with difficulty; they dry the system and excite thirst, are injurious to the breast, and agitate the nerves. Wines that have no perfume are weak, they do not digest easily, and are but slightly restorative.

5. Wines have different qualities in consequence of their age. Those are called new wines, which are only three or four months old, that have deposited but a small quantity of their lees, and retain the most of

the qualities of the must. These wines contain much sugar, which the fermentation has not converted into alcohol; this is the reason why they are very nourishing and contain but little spirits: they digest with difficulty, and disengage a great quantity of carbonic acid in the *primæ viæ*, which distends the stomach and intestines; they render sleep restless and agitated. The vulgar opinion of their causing calculi in the bladder and kidneys, is erroneous. When wines are more than three or four months old, they are called wines of a year; these are better than the preceding; but wines should be at least a year old to be desirable. Old wines are very generous, more restorative, but nourish less than newer ones; they fortify the stomach and promptly increase the energies, but they inebriate sooner and are more irritating; they should only be drunk in small quantities, and with water. Age frequently renders wines bitter. Wines of a middle age, that is to say, those of two, three, or four years, are the most healthy. At the end of six or eight years, the most of the wines lose their qualities and their strength; they then soon spoil, and in a few years some become insipid, others and the greater number of them become bitter and acid or musty.

6. Soil and climate have also a very great influence upon the qualities of wines. The ancients and moderns have always considered the wine of Cyprus (*vinum Cyprium*) as one of the most exquisite and most delicious wines. It is a good tonic, and is particularly proper for weak or infirm persons. It is very salutary, provided it be used moderately. Unhappily, this wine which is found in all countries, is rarely pure or natural.

The wine of Crete, (*vinum creticum*) was justly celebrated by the Greeks; it is, in fact, a most excellent wine, especially the muscat and the *malvosie*. The latter is nothing but the boiled muscat wine. The wine of Candia is not inferior in goodness to that of Cyprus, and possesses the same qualities.

The wine of Stanchiou, (*vinum coum*) is very sweet and very agreeable: it has a sweet perfume, and differs but little from the preceding.

The wine of Chios, (*vinum chium*) is much esteemed. Lisbon wine, (*vinum lisbium*) is comparable with nectar; it is very scarce in France. The wines of Hungary are more common: the most esteemed is the wine of Tokay, (*vinum tokaviense*) it is as good as that of Canary; it is a little drier than other sweet wines, and not quite so sweet. It may be considered as only a half sweet wine, whose taste is similar to that of Spanish wine mixed with excellent old champagne, which is free from must. It is made with a species of grape, that contain an abundance of sugar, and which are very ripe. In years of fine and dry autumns, these grapes are left upon the vine until December; but when this season is wet, they are gathered sooner, and the ripening of them is completed by drying them in an oven. By this process, they furnish a must containing much sugar, which the fermentation, when properly conducted, converts into an excellent wine. Wines, similar to that of Tokay may be made, says the celebrated Macquer, in countries which have the temperature of Hungary, if the necessary precautions are observed. The first precaution is, to choose and cultivate the species of grape which contains the most of the matter of



sugar, the second requires that these grapes be preserved until they are completely ripe, and to augment the proportion of sugar natural to them by diminishing the water of vegetation. The time of their maturity after they are gathered, scarcely exceeds the twenty-fifth or thirtieth day, and it might be abridged by reducing the must, by evaporating it over a fire, or by adding to it a sufficient quantity of sugar, to give it the same taste and consistence as that of the grapes which have been preserved four or five months upon the stalks in the vintage, and twenty-five or thirty days after they have been gathered. The third and last precaution, consists in conducting the fermentation very slowly.

The wine of Alby, (*vinum albanum*) is unquestionably one of the best wines of Italy. It was much esteemed by the ancients, and it is in no respect inferior to that of Falerne; but it has not the same strength as it formerly had, it contains less spirits, its taste is sweet, it does not effect the head much, and passes off easily; it is nourishing and a tonic. The most celebrated wines of Italy, and those most similar to the wines of Alby, are those of *Verdee*, *Moscadelle* and *Mont-Fiascone* in *Toscanella*. The muscat wines of Florence and Perousa, that of Marciminien, in the Venetian states; the wines of Naples, such as the greek wine of *Mount-Vesuvius*, and the *Lecryma-Christi*; those of *Tarentesia*, *Falerne*, and of *Syracuse*. There are perhaps many others, of a superior quality, but which are not so well known in our country.

The Spanish wines are generally much esteemed, especially that of Malaga, (*vinum malaccense*) in the

neighborhood of Gibraltar, this wine is mellow, and may be kept a long time; it is nourishing and fortifying, and is particularly proper for old persons, for the feeble and for convalescents. It is useless to remark that a great deal of mead is sold for Malaga wine.

The wine of Alicant, (*vinum alonense*) is red, a little thick, but agreeable to the taste, very nourishing and stomachic.

The wine of Tinto, Xeres, and Rota, are by no means inferior in quality to that of Alicant. To the Spanish wines may be added that of the Canaries which is light and may be preserved; it is made of the boiled must, of a kind of muscadine grapes which grow in these islands. It possesses the same virtues as the preceding; the most esteemed come from the island of Palma. Maderia wine is not inferior to it in goodness. The *malvoisie* of the island of Candia, and the other Greek wines, which are collected in Chios, Tenedos, and in the other islands of the Archiepelago, as well as that of Schiras in Persia, are of the same nature. In general, all these wines, as well of Spain, as of the islands are sweet, and may be kept for a long time. They are agreeable to the taste, nourishing and fortifying. Their use is not proper to warm, bilious, and irritable constitutions; and they should in no circumstance be drank, but rarely in small quantities.

German wines possess very different qualities from those of which I have just spoken. The rhenish, called, thus because the grape from which it is made, grow on the banks of the Rhine, is sweet, with a kind of acidity. It digests easily, and is not so heating as

the others: it is proper for the bilious, sanguine, and scorbutic; its use is also salutary to the inhabitants of southern countries, in whom it animates the circulation and blunted fibre. The wines of Mousul and Meinaa, have nearly the same qualities.

Burgundy wines, are of all the French wines, the most exquisite and the most salutary: they are roughish and tartarous during the first months, but become mild with age. Those of *Clos de Vougeot* and *Chambertin*, possess the greatest reputation, and next to them are those of *Nuits*, *Beaune*, *Pomard*, *Vollenay*, *Montrachet*, *Romanee*, *Chassaigne*, *Meursault*.

The wines of *Champagne*, are classed with those of Burgundy. Some persons even give them the preference. There are, in fact, among the champagne wines, those that unite the strength of the best burgundy, with a poignant taste, which is pleasant and exhilarating, and which is not met with in any of the other wines. In general, they are light and warm, mild, and slightly acid, and have an agreeable perfume; they are very inebriating and diuretic, their use should be interdicted to persons of much sensibility, and of irritable constitutions, for they powerfully excite the nervous system.

The wines of *Lyons*, and especially those of *Condrieu*, are also very generous, and of an excellent quality; they are sweet, and may be kept for a long time.

The wines of *Bordeaux*, and principally those of *Grave* are, as well as those of *Pontac*, but little poignant, but they are of an agreeable taste, nourishing, and do not much affect the head. Those of *Orleans*, are generous, heating, and inebriating, but they do not

attain their point of maturity until the second year, and may be kept five or six years. The wines of *Anjou*, and especially those that are white, are mild, exhilarating, nourishing, and may be kept for a long time.

Immediately after these wines, may be ranked those of the province formerly called *Franche Conte*, several of which are very similar to, and some of which equal those of *Burgundy* in goodness. Besides these, the excellent red wines of which the departments of *Jura* and *Doubs* furnish, such as those of *Salins*, *Port-Lene*, *Arsures*, *Byans*, *Mercurau*, *Troichate*, &c. &c. there are a multitude of others that are not less agreeable to the taste, and which are very salutary. The white wines of *Chateau-Chalons*, and of *Arbois*, possess justly, the greatest reputation. It was the latter that Henry IV. esteemed so highly, and of which he drank two bottles, at signing his treaty with the duke of Metz, out of breath in following him through the gardens of Monceaux. The wines of the departments of *Haute-Saone*, are also of an excellent quality, and especially those of *Morey*, *St. Julien*, &c.

The wines of the province formerly called *Poitou*, are white and weak, slightly acerb, and even acid; they differ but little from the rhenish. The grapes from which they are made, grow sometimes in the environs of Paris; but they are destitute of flavor, and not much esteemed: besides, the most of these wines are adulterated by the merchants, whose insatiable cupidity knows no bounds.

The southern departments of France, furnish generous wines, and those of an exquisite taste. That of



*Hermitage* is particularly esteemed: it has a red color, is light, has an agreeable taste, although a little roughish, and is supposed to be very stomachic. That of *Cote-Rotie*, is equal to it in goodness. The grapes from which both these are made, grow in the department formerly called *Dauphine*. The muscadine wines of *Frontignan*, *Lunel*, and *Tavel* are much esteemed. The wines of *Perpignan*, either red or white, are, of all those of the province formerly called *Languedoc*, the best; but they should not be drank in large quantities, for they contain much spirits, and soon communicate their influence to the head. They are proper for pituitous persons, for those who digest with difficulty, and who have a weak and indolent stomach. The wines of *Provence* are very nourishing and inebriating; they should only be used mixed with water. The most celebrated are those of *Marque* and *Gemenos*, near *Toulon*. Those of *Barbantane*, and of *Caux* near *Arles*; those of *Riez*, *Roquevaire*, *Aubagne*, and of *Canteperdrix*; the white wines of *Cassis*, *Marignane*, and of *Cannes*; the muscadine wines of *Saint-Laurent*, of *Ciotat*, and of *Ceurs*. All these wines have the most agreeable taste, and re-establish promptly, the energies; but they should only be used moderately, for their excessive or habitual use, terminates, on the contrary, by destroying them: they are particularly proper for old persons, for convalescents, and for infirm persons and valetudinarians.

In general, the most salutary wine, and at the same time the most agreeable, is that which is deprived of the greatest part of its tartar, or by the effect of fermentation, it is principally owing to this, that old



wines are superior to new, and it is to the proper manner of conducting the fermentation that depends especially, the quality of the wine. To succeed in making wine, it is necessary to seize the moment in which the wine should be drawn from the tub, and enclosed in casks; for however too little or too much the fermentation may be, it injures the wine.

Two periods should be distinguished in the vinous fermentation. The first is that in which it manifests itself in a tumultuous and active manner, it is at this period that the greatest quantity of the fermentable substances becomes fermented. This fermentation insensibly diminishes in consequence of the alcohol which is formed, and which it is necessary to arrest at the proper period, especially in dry wines. The liquid then becomes tranquil, the motion is no longer violent, but it is insensible, and continues; the wine which was thick, becomes clear, and it forms the first precipitate which is called lees or fœces. The substances precipitated are the seeds and skins of the grapes, mixed with a thick tartar and the sulphat of potash. They contain also a certain quantity of alcohol, and brandy may be obtained from them by distillation.

The effect of the insensible or secondary fermentation, is to augment, by degrees, the quantity of the alcohol, and to separate the tartar from it, this forms a second deposite, and adheres to the sides of the cask. As the taste of tartar is hard and disagreeable, it is evident that this second fermentation, by augmenting the quantity of the alcohol, and separating the greatest part of the tartar from the wine, ought to render this much more generous and more agreeable to the taste.

But if the secondary fermentation perfects the wine, and gives it qualities superior to that of the new, it is only in proportion to the correct manner in which the first has been performed, and to its being stopped at the proper period. When it has not entirely gone through its first stage, it forms but a small quantity of alcohol, and the most of its fermentable parts, not having experienced the act of fermentation, this is continued in the vessels in which the wine is poured, and it becomes active in proportion to the too soon suspension of the first fermentation. This is the reason wines frequently become thick, ferment, &c.; and if bottled, break a great many of the bottles, owing to the carbonic acid which is abundantly disengaged during the fermentation. We have had an example of these phenomena in foaming wines, such as the white wines of Champagne, Arbois, &c.

It is by intercepting the first fermentation, or rather by arresting it, before a quantity of the matter of sugar, has been *alcoholized*, that we give to these wines the foaming quality. In this state, they force out the corks of the bottles in which they are put, with a noise; they are sparkling, fill the glass with foam, and have a much stronger and more stimulating taste than other wines. All these effects are owing to the carbonic acid gas, which is disengaged during the fermentation that they experience in the bottles, which was interposed between the particles of the wine when bottled. When this gas is entirely disengaged these wines cease to be foaming, and they lose all their poignancy and their life. Wines deprived of this quality are not wholesome, and should be sparingly used. They frequently occasion heartburn and

the cholic; mixed with vegetable aliments they often cause them to contract the acid fermentation. They are, however, very nourishing, and possess an anti-septic and an anti-scorbutic virtue, hence, are proper for eaters of meat; they are also beneficial in putred fevers and the scurvy.

Wines, the first fermentation of which had been carried too far, are subject to other still more serious accidents; it is of the nature of a fermentable body, in which the act of fermentation has commenced, to continue in a more or less rapid and violent manner, according to the different circumstances, until it acquires the most complete state of putrefaction; it happens when the vinous fermentation is concluded, and sometimes even before, that the wine begins to sour. When the wine is in vessels well stopped, and in a cool cellar, the acetous fermentation is slow, but it is formed in a very obvious manner, and without interruption, so that at the end of some time, the wine is almost totally converted into vinegar, when the vessels are not well stopped, and when they are in a warm place; this evil is without remedy, because the fermentation cannot retrograde. It is well to observe, also, that heat and a communication with the air produces this effect, as well when the first fermentation has been correctly conducted, and the wine might have been kept for a long time, if it had been put in a cool place. It sours sometimes very soon, especially in summer, in a bad cellar, and in casks badly stopped; and as the best cellars are, in winter, much warmer than the atmospheric air, it is proper, when we wish to preserve wines, which are completely fermented and disposed to sour, to take them out of the cellar at the beginning

of winter, and to leave them exposed to the cold during the whole of this season.\*

Wine is also subject to many other alterations, such as becoming ropy and mucilaginous, or turning oily, &c. by the effect of continued fermentation. But we cannot follow all these details in a work of this nature, and in treating these subjects, we go beyond the real limits of hygiene.

Modern experiments prove that the good or bad quality of wines may depend upon the nature of the glass of the bottles, in which it is put, and that it is sometimes injured by their bad composition. There are two principal causes which vitiate it. 1. Several species of glass are not hard enough, not having been sufficiently fused, the acidulous tartrate of potash decomposes them. 2. They frequently contain an excess of impure fused earths, instead of the saline, which is the only proper one to form good glass. Hence, the glass is decomposed by the wine, and this by the glass; and wines are so injured by being kept in these bottles, as to produce serious inconveniences; consequently, we should not be indifferent respecting the choice of glass bottles. In general, neither wine nor acid should be put in very old bottles,

\* Professor Rush used to relate a circumstance that happened in Philadelphia, which corroborates this principle. A gentleman of that city had purchased a cask of wine for his own use, and on tapping it, found it sour; not calculating on its answering for any other purpose than vinegar, he had it rolled in the back yard to be out of the way. Some considerable time afterwards, when it had been exposed to the cold weather, &c. his servant on trying found the wine had become sweet and of a most excellent quality. One day when the master had several gentlemen to dine with him; his wine gave out, and he ordered the servant to run to a wine merchant and fetch a few bottles. The servant produced some of the wine from the cask in the yard, the master and his guests were delighted with it, and inquired from whom he purchased it, and were much surprised when the servant informed them where he got it.—*Tr.*



because they may be decomposed by these substances; for the glass, however good it may be, is not entirely unalterable, and the hand of time changes its nature; there is none that resists the action of the air of stables, printing offices, hospitals, certain manufactories, &c. &c. After some time, its surface is altered, it loses its polish, forms inequalities, loses its transparency, and is no longer susceptible of being cleansed. From the experiments of Cadet, we know that when the aggregation of glass is broken, it will not resist any solvent, not even the action of water, which, by simple boiling, dissolves the alkali of the glass; that the glass thus divided decomposes the salt, and that all the acids combine with it and form salts, which crystalize nearly alike.

The most indifferent wines are those known by the name of *piquette*, (*lora*, *posca*, *vinum secundarium*) which constitutes the drink of a numerous class of citizens in tolerable circumstances. It is prepared by pouring water upon the marc of the grapes, which is left to infuse, and is afterwards pressed. This drink does not keep over winter; it is unwholesome, contains very little alcohol, and much water; its use frequently occasions cholics, &c.

Brandy, (*aqua vitæ*) may be obtained from all substances which have undergone the vinous fermentation, from the wine of the grape, beer, cider, vinous mead, &c. It has a strong and stimulating taste, a sweet and pungent smell, is very combustible, and inflames as soon as an ignited body is brought in contact with it. It is composed of water, alcohol, and a small portion of oil, which prevents its transparency in distillation, and which in time, communicates a yel-



lowish color to it. This is the reason why old brandy has this color; this color is also, in part, owing to an extractive matter of the wood of the casks, which the brandy dissolves after some time.

Alcohol, or spirits of wine, is obtained from brandy by repeated distillations. When it is very pure, an ounce phial only contains six drachms and forty-eight grains. Alcohol is white, transparent, light, and an extremely volatile liquor; it has a strong and agreeable odor, a warm and acrid taste, and is very combustible.

It assumes an æriform state at the sixty-fourth degree of heat, inflames at all temperatures, gives by combustion much water and carbonic acid, and no smoke; it burns with a light flame, which is white at the centre, and blue at the circumference; it produces in combustion more than its weight in water. We thence easily conceive the reason why carbonic acid is formed in the combustion of alcohol.

Brandy and alcohol are the basis of all the mild liquors, which are nothing else than these two fluids charged with *aroma* and sugar. Brandy, and especially that of *Orleans* and *Languedoc*, are now much in use. Many persons prefer them to mild liquors.

The use of liquors is in general very prejudicial, and they have justly been called slow poisons. However, when they are not taken habitually and to excess, they may be salutary to persons subject to flatulency, and to those whose stomachs are indolent and digest with difficulty. But when taken daily or immoderately, they produce terrible effects; besides intoxication, they give rise to a multitude of other physical and moral diseases, of which I have already

spoken, that shorten the duration of life, and reduce man below the grade of brutes.

Brandy is also employed to preserve fruits, but by the most fatal of all abuses; it is frequently used as an alimentary seasoning.

Beer, (*cerevisia*) is a vinous drink, which is made with barley or some other *gramina*, with water and hops. It is used in the north where the vine does not grow; much of it is also drank in other countries, through a bad practice, rather than from necessity. The art of brewing consists in reducing barley into a state of malt, that is to say, it is made to germinate to a certain degree, to deprive it of the matter of sugar which it contains; to obtain this, the grain is at first soaked in the freshest and lightest cold water until it is swelled; after which it is exposed in heaps to the heat of the sun, or in an oven; the germination soon manifests itself, and as soon as the germ begins to appear, it is arrested by a slight scorching, which is accomplished by passing the grain through an inclined tube, heated to a certain degree; this scorching destroys, in a great measure, the viscosity of the feculæ, which is combined with the sugar in the *cereal* grain that have germinated. The grain is afterwards ground, and reduced into a meal; it is this meal which is called malt, and from which the matter of sugar is extracted by dissolving it in water; the evaporation is performed by boiling it in kettles, after which some plant of an agreeable bitter is added, such as the ripe hop, to give more taste to the beer and to preserve it.\*

\* Hop is a pleasant plant which gives to the beer its strength and its agreeable principle. It has been called the vine of the north, because in that country

Finally, the liquor is put in vessels with yeast, and left to ferment; nature performs the rest; we have only to assist her in the same way that we do in making wine, and to draw off the liquor as soon as it is covered with foam, for the vinous fermentation is then complete.

Barley is preferable to other grains for making beer, because the germination of it may be more easily conducted, and because it develops a greater quantity of the matter of sugar.

Beer is stronger or weaker, according to the quantity of the matter of sugar that has been dissolved by the water, and to the manner in which the fermentation has been conducted. The infusion of the malt does not ferment so easily as the juice of fruits; this is the reason it is necessary to add yeast.\*

The fermentation of beer presents the same phenomena as that of wine; it is at first active and tumultuous, afterwards becomes slower, and finally insensible. But this drink never attains that degree of perfection that wine does; it always contains a certain quantity of feculæ, which renders it more nourishing than wine; this is the reason that it cannot be kept so long, and is much more subject to sour in the stomach, especially that which has not been sufficiently fermented; besides, the viscosity of the malt is never entirely destroyed by the scorching and fermentation.

beer constitutes almost the only drink, and they raise hops upon high poles. Beer in which abisinthia is infused, instead of hops, is not only very disagreeable to the taste but is also very unhealthy. It is much more inebriating. The odor of this plant confuses the intellect and inebriates. The intoxication produced by beer impregnated with this plant is furious and violent.

\* Yeast is a froth which beer throws off in fermenting.

Beer was much used as a drink in remote times. It is pretended that *Osiris* made it known to the Egyptians. It is salutary, more nourishing, and contains less spirit than wine; it is consequently less heating and not so irritating, but it should be used in moderation, for it produces, as wine, inebriation, and the intoxication occasioned by it, is more dangerous than that of the other liquor, which has induced Pliny to say, "Oh, admirable industry of man! he has discovered the means of getting intoxicated with water."\* It is much better in the northern countries than elsewhere. A greater number of persons make use of it than of wine. They are better made, taller, stronger, and more robust; but they owe these advantages to climate, and not to beer, as some of its more violent admirers have pretended. Persons who drink it habitually, generally become corpulent, and they are slow motioned and inactive; we may cite for example the Flemings.

In general, beer is inferior in its qualities to wine, and is not suitable for pituitous temperaments, and those whose fibres are soft, lax, disposed to alkalescency and to humid cachexy, lastly to very spare persons. It is, on the contrary, proper for bilious persons, and in all cases where there is a tendency to putrefaction, for it possesses a real anti-septic virtue, especially that which foams much, in consequence of the carbonic acid, which it copiously disengages; it may be advantageously employed in scorbutic affections, and in putrid bilious fevers.

Good beer is limpid and of a fine color, and an agreeable taste. The white is lighter than the red,

\* Hist. Nat. lib. xiv. cap. 221.

and consequently preferable; it should be of a middle age, for when it is too old or too new, it is injurious to health; that which is brewed in March or April, is the best and may be kept the longest. There are stomachs which cannot support this drink; in these cases, it causes flatulency and cholic, and passes off with difficulty; it swells the hypochondria and belly. Sometimes also when too new, and when drank immoderately, it occasions a kind of gonorrhea, which is very easily cured by drinking a little brandy or any other strong liquor. Sour or spoiled beer should be rejected from use. That which is of a good quality furnishes, by distillation, a brandy pretty similar to that which is obtained from wine, with this difference only, it is less agreeable to the taste and smell.

**Mead.** There are three kinds of drink made with honey; the first is a mixture of honey and water, and is called honey water, (*aqua mulsa*;) the second is vinous mead, which is a solution of honey and water, and is subjected to the vinous fermentation; the third and last, is made with honey and wine, and is called *hippocras*.

“Authors pretend to say,” says Pliny, the naturalist,\* “that mead is a useful drink for those who are naturally of a very cold temperament, and for the *micropsyches*, as these authors call them, I mean for debilitated persons who can scarcely breathe. \*

\* \* \* \* \* Honey water, in addition to what we have just said of its virtues, is also considered a very good remedy for a cough. Moreover, it assists, when necessary, to produce vo-

\* Hist. Nat. lib. xxii. chap. 24.



mitting, if taken warm. Taken with oil, it is an antidote to the poison of white lead; it destroys the bad effects of the *halicaacbn*, as we have already remarked when speaking of this plant; it is also of great use, especially when taken with ass's milk, to those who have swallowed henbane; it is usefully employed in injections for diseases of the ears, as well as for fistuloes of the parts of generation. Finally, it is applied with soft bread for inflammations and other diseases of the vulva, for tumors which are suddenly formed, for luxations, and generally in all cases where it is necessary to soften the parts or to dissolve the tumors. Moreover, old mead was anciently used as a drink, but the physicians have at length disapproved of it, not considering it so healthy as pure water, nor so substantial as wine. It is true, that when it becomes old it is a vinous liquor; but all writers agree that it affects the nerves, and that it is very injurious to the stomach."

The second species of mead is a real wine that has contrary properties. The best and whitest honey is taken to make it, which is put in a kettle with little more than its weight of water, and they are dissolved, a part of it is separated by gentle boiling, taking care to remove the first scum. The evaporation is sufficient when a fresh egg will float on the surface of the liquor. It is then strained through a sieve, and is immediately drawn off in a barrel, which should be nearly full, and placed in a situation whose temperature is from twenty to twenty-eight degrees of the thermometer of Reaumur, and the bung hole lightly covered. The fermentation soon manifests itself, and continues two or three months; after

which it becomes imperceptible. During the fermentation the barrel should be filled from time to time with new mead, which is kept for that purpose, to replace that which has been thrown off by the fermentation in the form of froth. When the phenomena of the fermentation ceases, the barrel should be removed to a cellar, and closely stopped; a year afterwards, the liquor should be bottled.\*

Well made vinous mead is a kind of sweet wine, which is very agreeable, and which in taste differs but little from the Spanish white wine; it however, long retains the taste of honey, but finally loses it.

The fermentation of honey may be accelerated, like that of sugar, with very sweet must and sweet wines, which is slowly performed, by mixing the yest of beer with it, especially when those liquors are not intended to be drank as wine, but to be distilled for brandy or alcohol.

Mead has generally all the qualities of wine, and it is as inebriating as it; when used moderately it is not unwholesome. In Lithuania, Poland, and Moscovy, they have scarcely any other drink; its use is recommended in consumption, in consequence of the honey promoting expectoration: it is particularly proper for pituitous persons. New mead is not exempt from inconveniences; it occasions sickness, cholic, and diarrhea.

“As to honey wine,” says Pliny, “that which is made of old wine is the best, inasmuch as the honey mixes easily, whereas it will never mix well with sweet new wines. However, that which is composed

\* Diet. de chimie de Macquer, art. Hydromel.

of pungent wines, or with boiled honey, is preferable to the others, it is less flatulent, and does not swell the stomach, an ordinary inconvenience of honey wine. This drink increases the appetite; it loosens the bowels when taken cold, and generally constipates them when taken warm. Besides it is very nourishing, and persons who drink it become corpulent. Many persons have retained their strength to extreme old age, from living entirely on bruised bread soaked in this drink; a regimen substituted for all others. Romilius Pollion has furnished us with a famous example, one day the emperor Augustus tarrying with this old man, who was upwards of an hundred years old, asked him how he had been able to support himself in such vigor of mind and body to so advanced an age, Romilius informed him it was by using frictions of oil, and by drinking honey wine. It is pretended by some, that this wine is also very useful in the jaundice, called by the Latins *arquatus morbus*; and if Varron is to be credited, it is owing to this malady having been cured by this drink, that it has been called the kings disease.”\*

Notwithstanding the authority of Pliny, and the example cited, we are induced to believe that *hippocras* taken as an only nourishment, will not succeed so well as many others. This liquor is in fact, at once nourishing and exhilarating, but it is a thin aliment which would not suit the most of men, nor consequently, would it prolong life; it possesses no property which induces us to prefer it to good sweet wine, nor any properties different from those of this liquor.

\* Pliny, *Sud. Nat. Hist. lib. xxii. ch. 24.*

Cider, (*pomaceum*) is the juice of apples, which experiences the vinous fermentation. It has a sweetness, and a certain degree of pungency: these qualities are in a greater or less degree according to the species of apple from which it is made, and the manner in which the fermentation has been conducted. That which is made in the department formerly called *Normandy*, is supposed to be the best, it may be kept three or four years. Cider produces the same effects as wine, and when drank to excess, it occasions an intoxication, which continues longer and is more dangerous than that produced by wine. It has been supposed that the gout is more common in cider countries than elsewhere, and that wounds from bleeding in the feet, as well as wounds and ulcers of the legs, are more difficultly cured, whereas in places where wine is habitually used, wounds of the head are most dangerous. But we must be permitted to believe, that these phenomena are owing to other causes. Cider, although inferior in quality to wine, is a wholesome and nourishing drink, when it has undergone a proper fermentation: but it is pernicious when still new and not sufficiently fermented; in this state it produces the vegetable cholic, and other diseases of a pituitous nature, which frequently prevail among those who use it. Huxham advises with reason, sea vessels destined for long voyages to be provided with it, to prevent the scurvy.

Perry, (*pyraceum*) is a liquor made with the juice of pears. It is prepared in the same manner as cider; it contains more spirits, but possesses in other respects the same qualities.

## CHAPTER VIII.

*Of Coffee and Tea.*

COFFEE, (*caffea; coffea arabica, Lin.*) is the berry of a species of jessamine, originally of Moka, where it grows naturally as well as in the rest of Arabia. It is now cultivated in the islands of Bourbon, St. Domingo, Martinique, and Cayenne. Its use is very ancient in Arabia, Ethiopia, Egypt, and Turkey. It is supposed that a *Mollack* named Chadely, was the first who used coffee; his object was to relieve himself from a constant drowsiness which prevented him from duly attending to his nocturnal prayers. His dervises imitated him, and their example influenced the men of the law. "It was soon perceived," says Raynal, (*Philosophical and Polite History, book iii.*) "that this drink purified the blood by a mild agitation, dissipated the heaviness of the stomach, enlivened the mind; and even those who were not under the necessity of keeping awake adopted its use. From the banks of the Red sea, it extended into Medina, Mecca, and by the *pelerins*, into all the Mahometan countries.

It was customary in former times to burn it a great deal, which gave it an acrid and empyreumatic taste; at present it is not burnt so much, and it is also boiled less. Coffee made by infusion, is justly preferred to that which is boiled with the grounds. It is better, stronger, and more balsamic. When made in the form of a decoction, its volatile particles evaporate,



and it is indebted to these particles for its principal qualities, and when deprived of them it acquires a more bitter taste. Coffee is made by infusion, by pouring boiling water upon it, and by afterwards filtering it or letting it settle for a quarter of an hour. Coffee excites the action of the stomach and nerves, and extends its impression to the circulation, for it accelerates the motion of the blood and the secretions. It keeps off sleep and promotes the dissolution of the aliments in the gastric juice, and thus aids digestion. Its good effects are not limited here; they are extended to the mind, and electrify it; it excites the animal functions, puts in play the springs of the memory, warms the imagination, and generates ideas.

It is particularly proper for studious men, for corpulent persons, for those who lead an idle and sedentary life, for pituitous constitutions, for persons affected with humid asthma, in all cases of relaxation and atony, as well as in intoxication, which it dissipates. It is injurious to young persons, to sanguine temperaments, to the bilious and atrabilious, as well as to meagre persons, and those whose fibre is hard and irritable; to women subject to miscarriages, to those who have the whites, and to hysterical persons. It enlivens, irritates the nervous system, and augments its mobility; there are even individuals, whom the use of coffee affects so as to produce a tremor of the members some have been rendered paralytic, by its immoderate use, and there are others in whom it has occasioned an erysipelas, and an efflorescence of the skin. Some physicians think that the greater part of apoplexies and soporific affections, which are more frequent than formerly, are, in a great measure, owing to the use of

coffee, which has become general. However this may be, it is certain that its immoderate use is pernicious. Its bitter and aromatic oil, by strongly irritating the gastric fibres, finally destroys their tone. Milk or cream, which is mixed with the infusion of coffee, diminishes in a small degree, its irritative quality, but does not destroy it. If we believe one of the eminent physicians of this century, (eighteenth) coffee, with cream and milk is very injurious to women; and since the most of them have made use of it, the whites, ulcers of the womb, and many other affections of this organ, are become much more common than they were in the preceding centuries, no doubt, because it enervates the stomach, and communicates sympathetically, an impression of atony to the womb.

Tea, (*thea*; *thea bohea*, *et thea viridis*, *Lin.*) is a common shrub of China and Japan, the leaves of which, after having been scorched, are employed in infusion to aid digestion. In Japan and China, they do not make use of the tea until a year after it has been gathered. The Chinese make it by infusion, and take it without sugar or honey. The Japanese reduce it into powder, and put warm water in cups with a small quantity of the powder which they stir about, until the liquor foams; then they blow it for a moment, and afterwards take it. Tea is the ordinary drink of all laboring men in China.

Tea unites three principal qualities: it is sedative,\*

\* *Tea is a sedative.*—This certainly is incorrect, unless considered indirectly, then tea, as well as all other stimulants are sedatives. The very effects which Tourtelle attributes to tea prove it to be a stimulus, to many persons it is one of the most agreeable stimulants in nature. Professor Rush used to recommend those of his class who were designed for country practice, and likely to be much fatigued, to substitute tea for spirits. While I practised in the country, I followed the ad-

astringent, and has a very agreeable taste. It appears that it was not a vain caprice which introduced its use into China. The waters are there very unwholesome, ferruginous, and very disagreeable to the taste. Experience taught the Chinese, that they were improved by boiling, and the addition of some astringent plant, and nothing succeeded better with them than tea, to correct the waters of their country, and to prevent their bad effects; the tea possessed also, in consequence of its astringent and tonic virtue, the property of aiding digestion and promoting transpiration. But its habitual use is not exempt from danger, and according to the experiments of Smith, the infusion of green tea destroys the nervous sensibility, and the muscular irritability.

Green tea, distilled by doctor Letsom, furnished a strong narcotic odoriferous water; this is the reason why the Chinese dry it in a considerable heat, and keep it at least a year before they use it. Observation proves that it preserves its narcotic virtue as long as it retains its odor: which has induced it to be supposed, that this virtue is attached to its aroma. The English and Hollanders make a very great use of it; perhaps it is advantageous to them, in consequence of the great quantity of viands they eat half cooked: however, although the power of habit be capable of rendering null the action of the most energetic stimulus, they are very subject to diseases of the nerves. Tea is only suitable in cases of indigestion: it also

vice of this worthy man, and derived much advantage from his prescription. Indeed there is no stimulus that I can take, not even the best wine, that has so happy an effect on my system as tea. I always prefer it to any other, when about to perform a surgical operation, or on any other occasion when I think a stimulus requisite.—*Tr.*

produces gaiety, as all the other narcotics do; but its immoderate or habitual use weakens the organs of digestion, irritates the nervous system, and occasions a tremor of the members. The tea called *bohea*, is more narcotic, and, consequently, more injurious than green.

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## CHAPTER IX.

### *Dietetic Rules.*

BAD qualities of aliments and drinks, as well as intemperance, are the most fruitful sources of disease. The good or bad state of the body, the harmony or discord which reigns in the functions, depend in a great measure upon the regimen. There is, properly speaking, but one aliment, but there is a multitude of species, as Hippocrates has observed: *alimentum unum, et species ejus multæ*, (lib. de alimento;) and it is not easy to determine in particular those which are proper for each individual; for men, although possessing the same constitution, and placed in similar circumstances, are not equally affected, and do not experience similar effects from the same alimentary substances, so that nothing but experience can teach us what is useful or pernicious to each person. In fact, the gastric sensibility and the dissolvent powers of the digestive juices, are very different in persons of the most similar temperaments; what is a suitable aliment for one is in some measure a poison for another, as

Boerhaave has well remarked: *nullum alimentum universali titulo salubre dici potest; et qui rogat, quodnam est salubre alimentum, idem facit, ac si quæreret, quisnam sit ventus secundus, non cognito itinere.* (Van Swieten in Aph. Boerhaave, vol. i. p. 55.)

In others, the circumstances not being always the same, the sensibility of the stomach, and the dissolvent power of the gastric juice, are modified in them. It frequently happens that the man who digests an alimentary substance well to-day, cannot support it at another time, whilst an aliment more difficult to digest, but for which he has an appetite, will not cause him any inconvenience. It is necessary then, that he should also attend in the choice of his aliments and drinks, to the greater or less appetite which he has for such and such things. We cannot, consequently, establish any general rule on this subject; there are a great number of exceptions to be made, not only in relation to the divers conditions in which the system is found, but also to habit, which renders the use of less salubrious aliments necessary, and should give them a preference to others. (Aph. xxxviii. et l. sect. 2.)

Lastly. We must obey to a certain degree, nature, who, in different states of the body, seems to dictate by a kind of instinct or spontaneous appetite, such substances as we ought to use to prevent the diseases predisposed to, or to cure those which exist. It is this same *medicatrix naturæ*, which in putrescency produces the horror that we experience for aliments of the animal kingdom, and which excites in us an invincible inclination for vegetable substances, especially for those that are acid. In other cases, on the con-



trary, it excites a strong appetite for bitters, acerbis, absorbents, &c.

It is also impossible to determine with exactness, the quantity of aliments proper for each person. In general, as Hippocrates has said, a larger quantity of aliments is requisite for children and young people, than for the middle age and aged. *Senes facillime jejunium ferunt, secundo ætate consistentis; minime adolescentes, omnium minime pueri, et his autem qui inter ipsos sunt alacriores.* (Aph. xiii. sect. 1.) Children and young persons support abstinence with difficulty, owing to the expansive force predominating and radiating incessantly from the centre to the circumference, and digestion is the more active in proportion to the greater increase or growth of the body. We also eat more in winter than in the other seasons,\* in consequence of the cold concentrating the action in the interior, and the current of humors being more determined there; thence it follows, that a greater quantity of aliments are required to irritate the stomach, and the other epigastric organs, in order that they may oppose a sufficient force of resistance, and to send to the exterior the effort of action, under the weight of which they would succumb, were it not for this. But a scrupulous exactness in the quantity of aliments to be taken, is a ridiculous absurdity. The only rule which we ought to follow, consists in avoiding extremes, that is to say, not to eat too much nor too little. Doubtless, men were not destined to lead the life of Sanctorious, and to eat with the balance and measure

\* *Ventres hyeme et vere naturâ sunt calidissimi, et somni longissimi. In his igitur temporibus etiam alimenta plura exhibenda; innatum enim calorem majorem habente, nutrimento igitur copiosiore indigent. Indicium sunt ætates et æthiætæ.* (Aph. xv. sect. 1.)

in hand. Nature informs every person when they have eaten or drank enough; hunger and thirst are sufficient to teach them when they require more; these two sensations should serve as guides in a repast. But, unhappily, there are but few persons who know how to distinguish true hunger, from that forced hunger, which the seasonings of our aliments produce, and which they excite to an excess prejudicial to health.

The analogy which exists in relation to the nutrition between vegetables and animals, are sufficient to demonstrate the dangers of intemperance. Moisture and manure promote vegetation, and furnish the materials necessary for the development of vegetables, but an excess of either is absolutely pernicious and kills them.

It is the same with drinks and aliments, in relation to man; the most salutary things cease to be so, and become poisons, when abused. The wisdom of man consists in knowing how to regulate his passions and appetites, and in never permitting them to go beyond proper bounds. It is this moderation, or rather temperance, which ought to distinguish man, for those who are slaves to their bellies, are a disgrace to human nature, and cannot transgress the laws of nature without being punished.

The grand rule of temperance consists then, in taking only a sufficiency of food to satisfy natural hunger, and that of the most simple kind. All animals, except man, follow this rule, which is dictated by instinct. Man, endowed with reason, gives himself up to excesses; he is as much an enemy to himself, as he is to the society in which he lives; he has served upon his

table, at a great expense, the productions of both hemispheres; surcharged with nourishment, he only quits the repast to kindle new flames in his entrails. Coffee and strong liquors, taken in profusion, make a volcano of his stomach, which burns the whole system, and rapidly consumes life. He soon complains of flatulency, distention, pains and heaviness of the head, sleepiness, oppression, and of a multitude of other diseases, which gradually undermine his existence, and slowly prepare his destruction. "When I see," says Addison, "the fashionable tables covered with all the riches of the four parts of the world, I think I see gout, dropsy, fevers, lethargy, and the greater part of the other diseases, hidden in ambush under each plate."

Intemperance is as injurious to the moral, as it is to the physical part of man, and depraves the faculties of the soul. "See the pale visages of those men who come from a profuse repast. Moreover, the body fatigued with the excess of the preceding evening, makes the mind heavy, and renders terrestrial that part of divinity, that breath which animates us; whereas, the temperate man goes to bed, falls asleep, and rises in the morning full of vigor, to resume his functions."\* Pope well knew the empire of the glutton, when he said, "the grave Catius always speaks of virtue, and thinks that he who indulges the vicious, is vicious

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\* Vides ut pallidus omnis  
 Cœnâ desurgat dubiâ? Quin corpus onustum  
 Hesternis vitiis animum quoque prægravat unâ,  
 Atque affigit humo divinæ particulam auræ.  
 Alter, ubi dicto citius curata sopori  
 Membra dedit, vegetus præscripta ad munia surgit.

*Horace Sat. ii. lib. 2.*

himself. 'These beautiful sentiments are supported by him until the hour of dining, when he prefers a profligate, who has a good table, to an honest man who lives frugally.'

There have been public men, who, when fasting, were the most upright and even the most indulgent judges, but wo to the wretch who was arraigned at the bar after they had dined heartily! These were judges who would condemn the innocent as well as the guilty. In a word, intemperance, in addition to its being extremely injurious to health, and to its considerably shortening our existence, frequently leads to the most dishonest and infamous actions; it is a gross vice, which opens a door to all others. Gluttony has been justly observed by J. J. Rousseau, to be the vice of persons destitute of reason. The soul of the glutton is in his palate, he does nothing but eat; in his stupid incapacity he is only in his place, when at the table; he is only competent to judge of dishes.

Temperance is not only one of the fruitful sources of health and longevity, but it ought also to be regarded as the mother and *palladium* of the other virtues, and of a good disposition of the mind; it purifies the senses, and gives agility to the body, renders the understanding acute, the thoughts quick, the memory happy, the motions free, and the actions easy. By temperance the soul, as disengaged from the matter which confines it, enjoys itself, and contemplates the different objects in their true point of view. It was this which induced the sage Socrates to say, that we approach the divinity the more closely when we are contented with little things. Plato was an example



of sobriety and wisdom. Every body praises the temperance of Cato, surnamed in consequence of his eloquence, the Roman Demosthenes. Virgil and Cicero were of an uncommon sobriety. Galen, although of a very weak temperament, attained by means of temperance, an extreme old age, exempt from diseases. The famous civilian Barthole weighed his food and drink. Louis Cornaro, a Venitian nobleman, wrote his work on the advantage of a sober life, of which he furnished an example, at the eighty-fifth year of his age.\* Leonard Lessius, his translator, followed his example with the most happy effect. The celebrated Gassendi was very temperate, and the immortal Newton, who arrived at a great age, lived in the most temperate manner. Paul, the hermit, the visionary Anthony Arsinius Epiphanius, and a multitude of others, all of whom lived beyond an hundred years, on bread, dates, roots, fruits, and water, are powerful testimonies in favor of temperance. Lastly, our primogenitors only retained the health of body and mind to a very advanced age by observing sobriety and temperance, and it is to these means alone, that almost all the centinaries of our time, owe the long career which they have run, and the learned their success and glory.

The quality of food should claim our attention as much as temperance. There are a great many causes which may alter it, and render it more or less unwholesome. Aliments are sometimes injured by the seasons, but this is an evil which it is not in the power of man to prevent. There is an alteration which

\* Luigi Cornaro discorsi della vita sobria.



grain experiences by being kept too long, which renders it unwholesome; this evil is produced by guilty mercenaries, who only build their happiness upon the misery of their fellow beings. Too much severity cannot be shown those persons; they are the obnoxious enemies of society. The best grain corrupts and becomes pernicious by being kept too long, and especially that which has been washed. The practice of washing grain is very improper, for, although it remains but a short time in water, this penetrates it, notwithstanding its cortical part, and it swells; an intestine motion is then excited in it, which insensibly alters the gluten. Great heaps of grain have been entirely spoiled from this cause. Meat, as well as grain, by being kept, becomes unwholesome and very improper for use in the shortest space of time. All animal substances naturally tend to putrefaction, and they very soon spoil after having been deprived of life. A slight degree of fermentation softens the flesh of animals, and renders it more soluble, but when this alteration passes certain bounds, it is offensive to the taste, and when admitted into the stomach, if nature does not soon relieve herself by vomiting, it introduces a septic principle into the system.

The meat of sick animals should not be used, and especially those affected by contagious diseases. The police cannot watch the butchers too closely, to prevent them from distributing such meat, as the use of it is extremely dangerous. Amman relates, that twelve young persons died from eating the flesh of a cow that had died with an abscess. There are a thousand examples of this kind, which prove how pernicious it is to eat such meat. Contagion is very

often spread among people from this cause alone. As I think it a duty to insist on a point of hygiene so interesting, I will cite some of those cases.\*

Schenkius speaks of an epidemic dysentery, which ravaged Venice and Padua, in 1599, in consequence of the inhabitants of these towns having made use of some sick beeves which the butchers brought from Hungary.† Kircher relates that in Italy, the country people were attacked in the year 1617, with a sore throat; from having lived upon beeves affected with this disease.‡

In the Chronicle of Godefroy, we read that in 1655, there prevailed a pestilential disease which destroyed a great number of persons; it was produced by the use of fishes which were found dead in the lakes, and all the animals that eat these fishes which were not burned, became mad or delirious.

Cogrossi relates, that two countrymen having eaten of the flesh of a sick ox, were attacked with a violent diarrhea.§ Valisnieri adds to this fact an observation cited by Mercurialis, that of a contagious pestilence, which made great ravages in 1617, and which was thus communicated to persons.

Jean Meyer, wrote to Schrœchius, that some countrymen, having killed an ox affected with a contagious disease, were attacked with carbø or anthrax on the

\* Citizen Brasier has mentioned them in a work, entitled: *Advice to country people respecting the contagious diseases which attack men and animals*; printed at Besancon in the third year, and which cannot be too extensively distributed. This author, who united to social virtues the greatest talents in *zoology*, is known in the republic by the excellent articles which he has furnished to the agricultural dictionary of Rozier, has put this work in the power of every body.

† Hist. Hanov. gen. chap. xi.

‡ P. Kircheri scrutinium physico medicum pestis, lib. p. 97

§ Journal de Venise; Tome x. p. 141.

arms, accompanied with an acute fever, vomiting and purging of putrid matter, and that two dogs which eat of the flesh of this ox, perished the same day.

Jean Adam Geusel, relates that in 1712, there was a destructive disease among men and animals in lower Hungary; that the dogs which touched the flesh of the carcasses ran mad.\*

In a contagion which prevailed among the cattle of the province formerly called Vivarias, a butcher of Anduze, having bought a sick animal at a low price, distributed the meat of it to the soldiers of the *royal baviere* regiment, and all those who eat of it were affected with a putred dysentery.

Barberex relates, that they conducted the oxen to Auvergne, in the island of Minorca, and that these animals fell sick there. He adds, that those who eat of the flesh of them, were attacked with a malignant fever, accompanied with gangrene, which manifested itself on the second day, at the elbows and heels.

Bertin, a correspondent of the academy of surgery, relates among other extraordinary accidents observed at Gaudaloupe, upon the negroes of the quarter of the Capestre, that on the 22d of January, 1744, the animals of a plantation called the Source, were attacked with a very fatal contagion, which spread considerably, and that all those who eat of the flesh of these animals, were attacked after two paroxysms of fever and a violent cholic, with a debility which soon produced death.

All these examples, and an infinite number of

\* Constit. Epidem, Hungaria inferioris.

others which I shall not notice, ought to render the police attentive to the dangers consequent upon the use of meat of sick animals, and to fix its attention on an object which so much concerns the lives and health of the citizens. None but the meat of animals whose health has been proved by expert and honest *veterinaires*, should be permitted to be sold. By this means many public calamities would be prevented.

Regimen ought not to be uniform, and one should not constantly use the same aliments. The stomach, habituated to their impressions, would digest them too slowly, and it would be necessary to increase its action from time to time, by extraordinary stimuli. Besides, nature has distributed with profusion, a prodigious variety of alimentary substances, and she inspires man with an appetite for all these different substances, but not to abuse them. To use a great variety of meats at each repast, as our modern Luculli do is pernicious to health; those who indulge themselves in this way, are physically, and morally, an evil to society. We should confine ourselves to one or two dishes; experience has constantly proved that the greater number of those who have arrived to great age, have lived in this manner.

A dietetic rule of much importance is, to put as little seasoning as possible in the aliments. Exquisite dishes ruin the best temperaments; simple aliments taken in moderation, and only to satisfy nature, such as the meat of the ox, calf, sheep, hen, chicken, &c. boiled, roasted, or broiled, with legumes, fruits, good bread and a little wine, are preferable to all other aliments. High tasted seasonings should be but rarely employed, and with a sparing hand, except in some



circumstances. They irritate the organs of taste, and thus induce us to take more aliments and drink than are proper for us; besides those heating and stimulating substances, necessarily produce, when habitually used, and to excess, discord and disorder in all the system. These seasonings are only proper to those who have inert fibres, and to those whose energies, diverted too much to the exterior, require to be recalled to the centre.

The use of wine and of liquors ought to be moderate in all cases; but this moderation is only relatively, and these drinks may be taken in greater quantities by the pituitous than by the sanguine and bilious. Generous wine is proper for old persons, and those whose stomachs do not digest easily for the want of tone. It is principally useful in wet seasons, especially when the south or south-west winds blow, and in damp or marshy places.

It is salutary to make two or more repasts in the day; but we should not take new aliments, until we have digested those taken at the preceding meal, that is to say, about four hours afterwards, in order that the digestion of them be finished. The space of time necessary for digestion, is not, however, so fixed and invariable as not to be performed in a shorter or longer period: it is influenced by age, constitution, and the kind of labor one habitually follows. Children and young persons ought to eat more frequently than the aged and middle aged, because they require a greater quantity of nourishing juices for their growth, whereas the others only eat to repair the losses which they daily make, and to maintain the circulation of the energies. Although old persons are in a state which



enables them to support abstinence a great deal better than those who are growing; it is, nevertheless, necessary that they make several repasts through the day, but they should only take a moderate quantity of nourishment at a time. In this manner digestion will be easily performed, owing to the aliments not exceeding the energies of the stomach. Those who content themselves with one meal per day, expose themselves to frequent indigestion. Temperance is, especially necessary in old age; excess of aliments and strong drinks are more dangerous in this age than in any other.

It is not rare to see old men die with apoplexy, indigestion, &c. from partaking too freely in the pleasures of the table. In general, the repast of the evening, should be light, and especially when we retire to bed immediately after taking it, for when the stomach is surcharged with aliments, the energies are too much concentrated in the epigastrium, and the digestion is laboriously performed: the brain, excited by the action which it partakes with the epigastrium, preserves too much tension, and we are tormented with a want of sleep or unpleasant dreams.

This advice is of the greatest importance to studious and contemplative persons, to those who are corpulent and plethoric, and who are predisposed to apoplexy. Besides, it frequently happens, that the digestion of dinner is not completed by the evening; there may then result a conflict of determinations between the energies which tend to go off from the stomach, and those that are attached to it by the new aliments, and thence an irregularity of action in the different organs,

which gives place to vicious terminations, morbid irritations, agony, anxiety, indigestion, &c.

All great changes suddenly made are dangerous, aliments which are not very healthy, suit better to those who are accustomed to them, than others that are more wholesome, if they are not habituated to their use. This is the reason why, when imperious circumstances require a change in the regimen, it is necessary that it should be gradually made; otherwise we have to fear a total disorder in the system, and fatal diseases, as experience and observation have proved.

In prescribing these dietetic rules, we do not wish to be understood as condemning variations in the regimen, nor even some slight excesses which the circumstances of a social life frequently occasion. A rigid uniformity is only suitable for feeble persons, for those who are infirm, and for valetudinarious. As to those who possess good health, it is proper that their regimen be varied; some deviations are even at times necessary, to increase the action of the system, and to strengthen the motions: these deviations should not be great nor frequent, and they ought never to degenerate into *orgies*.

I have exhibited the advantages of sobriety and of temperance; described the fatal effects of the use of aliments of a bad quality, and given some general dietetic rules; it only remains for me to speak of the conditions relative to the digestive energies, necessary to a proper digestion of the alimentary substances, and to the support of health.

There are common signs which establish a good digestion, independently of the particular experience

of each individual. Those who announce a good constitution also, ordinarily indicate the energy and vigor of the digestive organs. But let us not forget that a good constitution is supported by a sober and regular life, and by exercise; it supposes the greatest durability of health, a facility to support labor, and to resist the vicissitudes of the seasons, the intemperance of the air, and slight excesses in aliments and in drinks. A man who possesses such a constitution, has a good appetite, digests well, and experiences no inconveniences from aliments and drinks.

There are also symptoms which enable us to judge when digestion is performed in a suitable manner, and which are proper to the *primæ viæ*; but they only exist *a posteriori*, for although a person naturally very robust is supposed also to have a very robust stomach, yet, this is not always the case; and in fact, there are a great many foreign causes which may act upon the stomach and bowels without extending to the circulatory system, and the stomach may be affected with a debility not common to the other viscera.

We know the stomach to be good, and that it possesses a sufficient energy for the labor of digestion, when we have an appetite, and do not feel irregular desires to eat, nor an aversion to food. These irregular desires certainly indicate an extraordinary sensibility of the stomach; and an aversion to food, indicates a contrary state, that is to say, inactivity, and an inertia of this viscus. The absence of these two symptoms, and that of cholic and borborygma, united to a facility of breathing, induces us to presume that the stomach is in a state capable of digesting well.

The other symptoms which demonstrate that the aliments which we have taken digest well, are to feel no weight in the epigastric region, to be entirely exempt from flatus and hiccough, and to breathe with ease; lastly, we experience a pleasant heat upon the skin, a slight increase in the pulse, a sensation of pleasure which is diffused over all the organs. And the excrements, which are one of the productions of digestion in the *primæ viæ*, are soft, reddish, not very offensive, and voided at the usual hour, and in a quantity that answers to the aliments that have been taken. *Dejectio alvi est optima coagmentata, mollis, subrufa, nec valde graveolens; ipsam vero transmitti oportet qua consuevit hora et ea copia quæ assumptis respondeat*, (Hipp.)

SECT. 4. *Regimen of robust persons.*

The regimen ought to be analogous to the constitution, and especially to the energies of the stomach. The nourishment of robust and vigorous men should be very different from that of weak, infirm men, or valetudinarians; they require consistent and tenacious aliments, which strongly exercise the digestive organs, in order to excite and support the system. Substances which are light and too easy to digest, do not make a sufficient impression on this viscus: the other organs will be benefitted at its expense, they will receive a part of its tone, and it will soon become languid and inert, and the body, although equally nourished, will be, nevertheless, much more feeble than it ought to be.

Diet should also be analogous to the exercise and labor which we undergo. Studious men, and those whose situations compel them to live a sedentary life,



ought to eat less than those who are constantly occupied in laborious and fatiguing work; their nourishment should be more delicate and lighter. Gross, compact, and hard aliments, which countrymen and mechanics digest easily, occasion serious accidents to a person effeminately raised; whilst the regimen of the latter would produce a radical enervation in those who laboriously exercise, and would be absolutely injurious to them.

Strong and robust men ought to vary their regimen, or rather they should not subject themselves to any one; to them a kind of regular and uniform life would be dangerous, and, as Celsus has well observed, “He who possesses good health and a strong constitution, ought not to confine himself to any particular regimen; he should frequently vary his manner of living; it should be sometimes that of the city, and sometimes that of the country; he should join in the chase, go a sailing, and sometimes rest; but ought frequently to take exercise, for rest renders the body heavy, and labor fortifies it: the one hastens old age, and the other prolongs youth. It is proper that he sometimes bathe in the tepid bath, sometimes in the cold; that he sometimes anoint his body, and at others neglect to do it; he should sometimes eat more than common, and at others less; he should sometimes partake in feasts that he formerly avoided. It is better that he make two meals a day than one, and these should be copious, provided the stomach digests well.” (Lib. i. chap. 1.)

SECT 2. *Regimen of delicate and infirm persons.*

Delicate, feeble, and infirm persons require a restorative regimen, and one analogous to the debility of



the digestive organs; they should use substances which indirectly augment the energy of the vital principle, by recalling a just distribution of the energies of the divers organs, and which, at the same time, give a greater degree of stability to the energies, by imparting to them an habitual activity, and one suitable to the exercise of the functions.

The most useful nourishment to such persons, is one which is substantial, light, and taken in a small quantity, but repeated several times in a day, Vegetable substances, and especially those that are of a flatulent nature, are not proper for them; milk diet is the most appropriate to their state, but the use of it must not be contra-indicated by any contingent circumstance, if so it is to be omitted. Milk and good wheat bread always unite the advantages of a vegetable and animal regimen. The most advantageous manner to use milk, is to take it from the udder of the animal, in this state it still possesses its *aroma*, which is very restorative, and experience proves that it repairs the energies in a greater degree, than it does after it has been sometime milked. Gaubius justly thought, that the good effects which result from being suckled by a good nurse, are not owing solely to the aroma of the milk, and to the emanations from the body, but also to an imperfect excitement of the venereal desires. We know that the ancient nations of the east made their kings, when decrepit, lie with beautiful young women, to rouse their energies; this was the motive which induced king David to lie with a young Shunamite. It is certain that a moderate excitement of the venereal desires is useful to old men, as well as to persons who are infirm, feeble, and ex-

hausted; it supports and renders the vital principle active; but it must not be gratified, for it would produce too great a deperdition of the energies. This phenomenon is owing to this principle: the universal radical system of the energies is always augmented when the corporeal and mental functions are alternately excited in just proportions.

Debilitated and infirm persons, and valetudinarians ought to abstain from substances which are fat, viscous, heavy, and difficult to digest, and to exercise proportionately to their energies. Exciting and sedative means, combined and modified according to these circumstances, are of the greatest efficacy. To change the habit of the aberrations of the energies, and to re-establish their equilibrium, it is necessary to impress assiduously, and for a long time, on the vital principle, affections of an opposite nature. These effects have been produced by the frequent and alternate use of the tepid and cold bath, applied in quick succession; by riding on horse-back and in a carriage; by dry frictions, or those with cloth penetrated with the vapor of benzoin, amber, or ground pine, and by the use of tonic remedies, such as iron, especially the chalybeate waters, the Peruvian bark, and other bitters, taken at different intervals, in order that nature may not be too much accustomed to, nor offended by the too frequent action of these means. As to the other means, it is proper to follow the advice of Celsus, who expresses himself in these terms: "Delicate persons, in which class I include," says this author, "the most of the inhabitants of towns, and almost all studious men, should use many precautions. It is necessary that they should regain, by an assiduous care of them-

selves, what their feeble constitution, their studies, and the nature of the place which they inhabit, have deprived them of, as regards health. Thus, among this class of persons, those who digest well, may rise early in the morning; those who do not digest so well, should remain longer in bed, and if they are forced to get up, they should lay down in the course of the day. When we digest badly, it is proper to continue in bed, to keep quiet, and not to take any exercise, nor to apply ourselves to any kind of work. When we are subject to eructations, which are not accompanied with pains of the stomach, we should from time to time drink some glasses of cold water, and repose ourselves; live in a house well lighted, exposed to the wind in summer, and to the sun in winter. We should avoid the mid-day sun, the cold of the morning and evening, and the vapors of rivers and lakes. We should not expose ourselves to a cloudy cold air, nor to the heat of the sun, but should guard against the vicissitudes of heat and cold; for nothing has a more powerful effect in producing rheumatisms, catarrhs, and defluxions, than these causes. In places where the air is contaminated, and where the causes, of which we have just spoken, sometimes produce pestilence, we should be particular to observe these precautions.

“There is a certainty of health, when the urine, which we pass in the morning, is first whitish and afterwards yellowish. When we awake, we should remain sometime in bed, and afterwards, unless it be in winter, wash our mouths with cold water. In long days, we should sleep before, and in short ones, after eating. In winter we should rest during the night,

and if we are obliged to labor, it should not be done immediately after eating, but when digestion is completed. He who works during the day, either for himself or for the public, should rest sometimes. Exercise ought always to precede eating; this exercise should be less among those who do not work much, but who digest well, and greater in those who are in the habit of working, but who do not digest so well. Reading aloud, the exercise of arms, tennis, and walking, are salutary exercises. The place selected for walking, should not be entirely level; when there are ascents and descents it is more beneficial; this description of ground affords a variety of motion, which is salutary to the system, unless it be too weak. Walking is better in the open air than under a portico; better, if the head will permit it, in the sun than in a shade; better in the shade of walls and lanes of trees than of roofs; it is better to walk in a straight course than otherwise. The exercise should be sufficient to excite a perspiration, or at least a lassitude not accompanied with fatigue. It should be greater at sometimes and less at others. As to the athletia, we cannot however prescribe fixed rules; it is sufficient to say, their exercise should not be immoderate. After exercise, it is sometimes proper to perfume, either in the heat of the sun or that of a fire, and at others to bathe; but this should always be done in a room that is high, large, and well lighted. It is not, however, always necessary to anoint or to bathe, but it is proper to do both frequently, according as the body is disposed, and to rest for sometime afterwards. As to aliments, it is never advantageous to take too much; there is also a danger in not taking a sufficien-



cy. Excess in drink is ordinarily less pernicious, than that of eating. It is better to begin the repast with salted articles, legumes, and other diet of this nature, and afterwards to take meat. The best method of cooking meat is roasting or boiling. All ragouts are pernicious for two reasons: first, in consequence of their taste, which irritates and increases the appetite too much; secondly, they do not digest so easily, even when taken very moderately. Desserts are not injurious to a healthy stomach, but they sour in a weak one. Hence, when one has not a good stomach, it is better to eat dates, apples, or other similar fruits. When we drink more than necessary, we should quit eating, and not do any thing while the stomach is full. When we eat much, digestion is performed more easily by drinking a glass of cold water, by keeping awake for some time, and then enjoying a calm sleep. When we have dined heartily, we should not expose ourselves to cold, or the contrary extreme, and labor; they are much more injurious after a full meal, than when we are hungry."

SECT. 3. *Regimen in the divers climates and in the different seasons.*

Regimen ought to be varied according to the country and season. In the northern countries and in cold seasons, animal nourishment is proper. The use of vegetables is more appropriate to the inhabitants of warm climates, and in the warm seasons; but in temperate climates and in similar seasons, it is proper to observe a mixed regimen, and always to use meat, pulse, and fruits. Nature indicates in a very obvious manner, these different sorts of regimen, by the divers appetites which she excites in man, accord-



ing to the temperature of the climate and of the season. The northern nations live very well upon meat, and even that the most difficult of digestion, owing to their being strong and robust, and also to the human system having a strong tendency to acidity. The vine does not grow in the north; cider, perry, and beer, and especially the latter, are the common drink of the inhabitants of this country. The kind of aliments and drinks, with exercise proportioned to the vigor and constitutional strength of the inhabitants, is necessary to the acidity and to render the *animalization* complete; they are proper to exercise more forcibly the stomach, to support the free circulation of the energies, which, were it not for this support, would concentrate in the interior, and be converted into a dangerous spasm. It is not the same in southern countries, where the humoral system strongly tends to *bilification*. In these countries, the energies are continually attracted to the exterior organ by the constant action of heat, and the epigastrium is, consequently, nearly deprived of them; hence, atony and spasm would succeed each other rapidly, if nothing was opposed to the habitual divergence of the energies. It is necessary then for persons in those situations, to use more vegetables, than those in others, not only to attenuate the excessive sensibility of the organs of sense, but also to moderate the effervescence of the blood, and to prevent the progress of the too great secretion of bile. Persons in this situation should drink wine, and season their food to excite the sense of hunger, and attract the energies to the interior from which they have an incessant tendency to diverge. Hence, nature, whose principal object is the preserva-

tion of created beings, has produced in those countries, the vine, and acrid and aromatic condiments.

What I have just said of regimen, relative to the northern and southern countries, is also applicable to the cold and warm seasons. As to temperate countries, we must be influenced by the different seasons which prevail in them.

It is, in general, in the cold and wet seasons, as winter, that strong aliments are proper; and, to use the expression of the ancients, heating and dry substances, such as game, pork, salted meats, roasted, fried, pasteries, and acrid and exciting seasonings. It is also more proper to drink a large quantity of generous wine, without water, in winters, than in the other seasons. In winter the digestive forces possess the greatest energy, and the dissolvent power of the gastric juice is considerably augmented. It is then necessary to exercise powerfully the stomach, to give the system a tone which it ought to have, to enable it to resist the impressions of this cold, wet season, which causes the actions to flow to the epigastrium, and to prevent a constant concentration of the energies in this centre, as it would be fatal. Winter is also the season of feasts. But it too frequently happens, that the entertainments of relations and friends degenerate, especially in the country, into disgusting orgies, which are as great a disgrace to human nature, as they are prejudicial to health. In winter we require and eat much more than we do in any other season; consequently, winter frequently produces plethory, and the first warm weather of spring, frequently determines catarrhal and inflammatory diseases. These affections might be prevented among the plethoric, by a lent, to

which they should subject themselves for some time, at the end of winter and commencement of spring.

This usage, established by the Roman church as a religious act, has always appeared to me useful in several respects. By diminishing the plethory, it prevents many diseases peculiar to spring; besides it is the period which nature has established for the renewal of the animal race, whose flesh is, consequently, less salutary, and not so good as it is at other periods.

Spring is a warm and wet season, it affords frequent rains, which are necessary to vegetation. In animals it promotes the production of blood, and the expansion of the eccentric force. It is proper to maintain a just equilibrium of action in the system, and to prevent the disease dependent upon an excess of blood; it is advisable to diminish the animal nourishment, and to use vegetables; it is also proper to drink less wine than in winter, and what we do drink should be of the lightest kind, and this even diluted. Strong seasonings may be very injurious, especially to the plethoric.

Persons of a sanguine temperament, have the most to fear from the catarrhal and inflammatory affections of winter and spring. They should, therefore, avoid substances which augment the mass of blood, and which heat it, and those which are opposed to the free development of the eccentric force. This is the reason why, in addition to the regimen recommended above, they should not take too much exercise, should avoid sudden changes from rest to exercise, and from a warm to cold temperature; and that they do not too soon leave off their winter clothing.

The most appropriate remedies for the diseases of winter and spring, are in general, repeated bleedings, according to the plethora and degree of fever; vomits\* when the part affected is situated above the diaphragm; and purges when the seat of disease is below this organ;† blisters applied at a proper period; lastly, antimonials, amoniacs, opiates, and diaphoretics at the end of a catarrh. We have less to fear from meat soups and animal substances in the diseases of winter, than in those of spring. In spring, barley water, rice cream, and panado, are most proper, because the vernal affections are most decidedly inflammatory, and tend eminently to become so.

Warm and dry seasons, as a summer regularly constituted, require the use of light aliments and those easily digested, and especially those of the vegetable kingdom.

The veinous system is then much more active, and the bilious tendency greater. It thence results, that to prevent diseases which are frequently excited into action by this cause, it is proper to make use of soft aliments, (*molliores cibi*) as Hippocrates says of the flesh of young animals, “of pulse, and of fruits; to drink wine but moderately, and that mixed with water, which should be cooled with ice.” It is also proper to mix seasonings with the aliments, but not in large quantities, especially to sanguine or plethoric persons. In summer we should abstain from hard and compact aliments, from glutinous and fat meats, from the flesh of

\* I consider vomits in affections of the breast, a very doubtful remedy, and one which should never be used without the advice of a skillful physician.—*Tr.*

† *Supra septum transversum affectiones quæ purgatione egent, sursum pungante opus esse indicant; quæ vero infra, deorsum.* (Hipp. Aph. xviü. sect. 4.)



hogs, game, cheese, &c.; and we should avoid violent exercise, especially during the hottest part of the day. Bathing and iced drinks\* are of the greatest utility in this season.

Some have advised, and others have condemned the too general use of fruit during summer. To abstain from it is very prejudicial, it is a salutary nourishment, but one which should not be abused. Many very serious bilious diseases, especially dysenteries, prevail epidemically in the years in which fruit is scarce. On the contrary, they are rare and mild, when there is a plenty of fruit, and when it is of a good quality. I have already remarked, that when fruit is used too freely, it gives rise to affections produced by acidity. It is also necessary to remark, that it is not proper to convalescents of dysentery and intermittent fevers; for, although its use corrects the tendency of the humors to *bilification* and putredity, it nevertheless, debilitates the system, owing to its atonic and sedative qualities, which causes the concentric force to predominate, and thus occasions relapses. The moderate use of fruit during these diseases, has been justly recommended, but it should be abstained from during the convalescence; or at least, should be then eaten in

\* Iced water is a dangerous drink, unless used with care. When water is drank too cold, it frequently produces a spasm or cramp in the stomach, that soon terminates in death. Our ordinary spring water is cold enough for all healthy purposes; and where the system is heated by exercise or other means, it should be used with care; by washing the face, hands, and mouth, and thus judiciously tempering the system it may be used with impunity; or, if the person is at work and will continue his active labor it is not likely to prove injurious. In our cities where hydrant, or stagnant water, is used, and in many districts of the country; where the springs are near the surface of the ground, and the water, by consequence, warm in summer, ice is a luxury and may be used, if proper care be taken, without injury.—*Tr.*



very small quantities. Persons who possess a good health, should also use it moderately, when they live in wet and marshy countries, because by enfeebling the system, it predisposes this to the reception of the aqueous and marsh miasma.

Anomalous seasons, and those marked by sudden changes of the temperature of the atmosphere, in which meteorological instruments traverse in a very short time, a great space, as in autumn, and occasion sudden conversions of contrary motions in the animal economy, require a tonic and fortifying regimen, especially when cold and dry weather predominates, and when winter approaches; it is then necessary to use a greater quantity of meat and pure wine. It is however, proper to mix vegetables with the meat; they are the more useful in proportion to the great and continued heat of the summer. We should remember that it is at the end of summer and commencement of autumn that bilious affections occur, and that it is at these periods that the bile degenerates and becomes atrabilious. But the use of fruits, and especially of grapes, is the most efficacious and most proper means to prevent the terrible explosion of this degenerate humor.

In general, persons of a bilious or atrabilious temperament, should use but a moderate quantity of aliments, in summer and the first of autumn, as Hippocrates advises when he says, "in summer and autumn, bilious persons do not easily support aliments, but more so in winter, and not quite as much so in spring." (Aph. xviii. sect. 1.)

The most efficacious remedies in the commencement of the diseases of summer and autumn, are emetics,

acid drinks, pure cold or ice water, camphor, in a word, all the refrigerating antiseptics; and in the course of these diseases, when the energies are reduced, tonics and stimulants, such as bark, Virginia snake root, &c. Bleeding and the application of blisters are not so much indicated as in the other seasons; however, there are inflammatory or catarrhal complications which require the use of these remedies. As to aliments, they should be from the vegetable kingdom, and scarcely ever from the animal, except sometimes in the second part of autumn, and in cases of convalescence.

The regimen ought to vary according to the kind of the season and the anomaly. The first irregularity common in winter and spring, is that in which the winter is dry, cold, and in which the north wind prevails; a rainy spring, with a predominating south wind.\* In the first season we have to fear inflammatory diseases; in the second, bilious, catarrhal, gastric diseases; lastly, in the summer which succeeds such a spring, bilious catarrhal fevers.

The prophylactic regimen which the sanguine and plethoric ought to observe during a dry, cold, and westerly winter, as well as in all seasons which resemble it, consists in using mild, moistening aliments, and especially vegetables not highly seasoned; to drink less wine than common, and to dilute it with water; to guard against the cold by dressing warm; to take moderate exercise; to take more sleep than customary; and to avoid the sudden impressions of cold, and cold drink, when the system is preternaturally warm.

\* Hipp. Aph. ii. sect. 3.

The diet proper in the wet seasons, when the wind blows from the south, are such as will fortify the organs which the heat and moisture have relaxed and debilitated, to promote the expansion of the eccentric force, and to prevent a bilious catarrhal putredity, which such a constitution favors. Consequently, the nourishment ought to be succulent and tonic. It is beneficial to use seasonings and more wine than common, also coffee, bitters, in a word, substances that fortify the system; to take much exercise, and use dry frictions; to wear warm and electric clothes; finally, to have early recourse to evacuants when there are symptoms of hardened fœces existing in the bowels.

Another irregularity of winter and spring\* is, when the first season is rainy and calm; when the south winds predominate, and when such a winter is succeeded by a dry spring, with prevailing westerly winds.

From what I have just said, we easily perceive, that we should act during wet winters with prevailing north winds, as we do in the springs similarly constituted; and during a dry constitution with prevailing westerly spring weather, as in winters of a similar constitution. During the wet seasons in which the south winds blow, bleeding is rarely necessary. Emetics, purges, blisters, amoniacs, diaphoretics; in a word, stimulants and tonics are the most suitable remedies in the diseases which prevail during these seasons. Whereas, in those which are dry, and in which the north winds predominate, bleeding and antiphlogistics are, generally, the most proper to diminish the

\* Hipp. Aph. xix. sect. 3.

inflammatory irritation, and the concentration of the energies.

The first irregularity of summer and autumn has been described by Hippocrates, (Aph. xiii. sect. 3.) It consists in the summers being dry, with a predominant northern wind, and the following autumn rainy, with a southern wind. The sanguine and bilious temperaments are the most exposed to the inflammatory and bilious diseases of the first season. They ought, consequently, to have access to the antiphlogistic means, of which I have already spoken, and which are proper in dry seasons, with northern winds. As the pituitous and cachetic find themselves much affected by a cold and dry temperature, and as the progress of the formation of phlegm is diverted by the action of this temperature, it is necessary for them to live a sober and regular life, in order that they may not lose the advantages of such a season, which is extremely favorable to them. As to the autumn, it is proper to use the sthenic means, of which I have spoken in treating of the regimen, which should be observed in rainy seasons, with southern winds, and to have recourse to vomits and purges, as soon as there appears the least indication of sabura.

As the diseases which these two irregular seasons generate, develop themselves, principally during the following winter, and as these diseases are bilious catarrhs, atrabilious catarrhs, &c. we easily conceive, that the most efficacious curative means are, in general, emetics and purges in the commencement, vesicatories, exciting and tonic atiseptics, and frequently vermifuges.

The second irregularity of summer and autumn, is



dampness and a predominancy of south winds, which prevail during these two seasons; "we should expect," says Hippocrates, "many diseases during the winter which follows."\* This southern constitution, continuing during two seasons, produces catarrhal diseases among the pituitous, and bilious or atrabilious catarrhal affections among those who are upwards of forty years of age. The regimen and the other prophylactic and curative means, are the same as those recommended above, in speaking of the rainy and southern seasons.

The autumn is irregularly constituted, when it is dry and the northern winds prevail. This autumnal constitution is favorable to pituitous persons, but it is injurious to the sanguine, (especially when the preceding summer has been also dry, and frequently accompanied with north winds,) to the bilious and atrabilious. Plethoric, bilious, and atrabilious persons, should confine themselves to a moist and mild regimen; and especially vegetable and acescent; they ought to take but little exercise, sleep more than common; in a word, do all that I have said respecting the concentration of the energies and inflammatory irritation.

#### SECT. 4. *Regimen of constitutions and ages.*

A vegetable diet is generally proper for sanguine and bilious temperaments; they ought to use meats but moderately, because they produce sanguine and bilious plethory. The sanguine, however, provided that the blood be not superabundant, may freely use all kinds of aliments and drinks; it is even proper that their mode of living should be frequently varied. It is to

\* De aëre, aquis et locis.



these that the advice of Celsus is peculiarly applicable, not to attend to any particular rule of regimen, but, on the contrary, to adopt very different ones. It is not the same with the plethoric. The aliments proper for them, are those which are not very nourishing, and their drinks should be cooling; they should use moderate exercise, and regulate it according to the different seasons; but they should abstain from coffee and liquors; they may drink a small quantity of wine mixed with water; beer is even preferable. Salads, fruits, pot-herbs, as lettuce, succory, parsley, sorrel, lean soups, and white meats, seasoned with acids, as vinegar, lemon juice, verjuice, are the most proper aliments for these constitutions.

The plethoric and those who are fat, ought also to avoid succulent aliments; they ought especially to abstain from fat and oily substances, and from high seasonings, which by augmenting the sanguine or inflammatory diathesis, necessarily produce serious diseases of this genus; for the same reason, they should drink very little wine, and rarely pure, to prefer a diet of vegetables and white meat, and to avoid those articles that abound in gluten.

This same regimen is proper for bilious temperaments; it is the only one proper to divert the progress of the formation of bile, and to prevent the diseases which are the consequence of an excess of fluids; they, as well as the plethoric, ought to use acrid and aromatic seasonings very moderately, and in general all irritating and heating substances. Their nourishment, as Hippocrates has well observed, should be watery: *Biliosis ratio victus humectans adhibenda, (de affectionibus.)* Acids are particularly proper for

them—*biliosis naturis acetum confert*, (*de vict. rat.*) and they should not use milk, cheese, and fatty substances, black meats, and sweet aliments, sugar and honey which, as Hippocrates has already remarked, turns to bile very soon, and augments the quantity of this fluid, with which they abound; they should also drink but little wine and that rarely. Water is the most proper drink for them; in addition to its possessing a real anti-spasmodic virtue, it is also opposed to the formation of an abundance of bile, and consequently has a tendency to prevent the bilious affections, to which the heat of summer, or other causes, frequently give rise. Hippocrates recommended the use of it in acute fevers, cholera, and other affections depending upon a bilious diathesis. The exercises of the bilious should be moderate, and their sleep long.

The melancholic should abstain from gross and visciduous aliments, and among others, from non-fermented farinaceous substances, from flatulent articles, and those difficult to digest; also from strong seasonings, and generally from every thing which can excite the already too exalted sensibility, and augment the progress of *animalization*. Bread well fermented and well baked, the flesh of young animals, or rather white and gelatinous meats, as those of veal, lamb, hens, chickens; pot herbs and fruits, light wines diluted, small beer, and weak cider, are the aliments and drinks most proper for this temperament. Black meats which abound in gluten, as those of old animals, or those which have exercised much during life, as the ox, pigeon, game, the sea fish and especially the cetaceous; those of ponds, salted or smoked meats, legumes,

milk and cheese, are prejudicial to them. Barley and rice cream, &c. are salutary, owing to their being softening, and to their promoting sleep; to this regimen should be added light exercise in the open air, and in a temperate, but not damp atmosphere, and to avoid too much dissipation and idleness.

The aliments and drinks which are proper for the sanguine, bilious, and atrabilious temperaments, are not proper for the pituitous; they would be very pernicious to these; an opposite regimen is the most proper for this temperament. The laxity of the solids, the aquosity of the humors, the predominance of the action of the cellular and lymphatic system, and the imperfection of *animalization*, contra-indicate the use of relaxing, watery, and acescent substances. The regimen of Pythagoras is very injurious to the pituitous; they should use vegetables, but moderately, and among those proper for them, are those called *animal plants*, owing to their containing azote; and the acrid which provoke the urine and transpiration, as the cruciferous, the warm diuretics, as the parsley, asparagus, and the aromatics, which strongly excite the action of the solids. The pituitous should abstain from watery aliments, from those which are viscous and fat, from the flesh of young animals and fish, from non-fermented farina and legumes, especially those which have a husk or shell; their nourishment ought to consist of meats abounding in gluten, such as beef, mutton, pigeon, game, &c.; they have nothing to fear from seasonings, nor from the use of old, light, but generous wines, pure, or mixed with a small quantity of water, nor from coffee, and even strong liquors, but taken moderately. There is no constitution which

requires more exercise, and especially in a dry and warm air. Hence, we rarely see pituitous persons among soldiers, laborers, and men who work. This temperament is frequently the production of idleness, and labor insensibly cures it. It is also improper for the pituitous to sleep as much as other persons. "Sleep," as has been well observed by Hippocrates, "renders the system moist, but the contrary state dries it." It is necessary that adults of this constitution should sometimes endure hunger, which dries the body, and that they live in mountainous countries exposed to the north or east, (west.)

Finally, every thing which can augment the action, and establish a just reparation of the energies throughout the system, every thing which is capable of promoting the *animalization* and augmenting the secretions, is the most advantageous in this constitution. The insensibility and apathy of the organs of the pituitous person, which make him almost an automaton, require the use of excitants and stimulants.

As to the pituitoso-atrabilious and atrabilioso-pituitous constitutions, a mixed regimen is the most proper for these; and the animal or vegetable diet should prevail, according to the predominancy of the pituitous or atrabilious humor.

The regimen of the different ages of life should have for its basis, that of the constitutions and seasons analogous to them; for, as I have already said, the constitution of infancy is the pituitous, that of youth the sanguine, that of manhood the bilious, lastly, that of old age the atrabilious or atrabilioso-pituitous. However, children, although pituitous, and even young people whose constitutions are sanguine,



ought to use but a small quantity of viands; legumes, roots, pot-herbs, and fruits should constitute their principal nourishment. Wine and strong liquors ought to be absolutely interdicted, until the eighteenth or twentieth year.

Purely animal nourishment would be extremely prejudicial in the early periods of life, inasmuch as it would be injurious to the development of the organs. From the gelatinous character of the humors, and the propensity of children for vegetable productions, we see that the object of nature is to oppose the too great *azotization* of the nourishing juices, in order that, by partaking less of the albuminous and glutinous state, they may harden less, and form looser and more flexible solids, which accommodate themselves to the extension and growth of the body. Wine and strong liquors are equally contrary to the views of nature, for these drinks are very irritating, and the irritability of the constitution is very great at this age; but in proportion as life advances, animal diet becomes more necessary, and also the use of wine, because there is then more to repair, and the *azotization* should be less impeded, in order that the humors, being more *animalized* and more concompressible, may give to the parts which they repair, all the solidity proper for them to possess in the solstice and decline of life. We thence easily conceive, why the action of the cellular, lymphatic, and gastric system is greater in infancy than in the other periods of life, and why the gelatin is more abundant; but in proportion as we advance in the narrow circle of animal existence, the action of these systems diminishes; in old age it almost entirely ceases, and the humors then acquire an excess of



animal properties; consequently, though old people be surcharged with pituitous juices, which are produced by an imperfect digestion, and of which nature endeavors to free herself by different outlets, we may be certain, that in general the few humors which they assimilate, are much more of an animal nature, and contain much more albumen and gluten, than that of young persons and children, whose blood is, in a great degree, gelatinous. The excremental humors are also much more foetid and more acrid in old age, than in the other periods of life.

In general, young people ought to avoid indolence, inaction, remaining in bed too long, sleeping on soft beds, suspicious company, licentious reading, venereal pleasures; to abstain from high seasoned succulent meats, strong liquors, and to drink but moderately of diluted wines; in a word, they should avoid every thing that can deprave the manners, and hasten the consumption of the vital flame.

Regimen, as I have already said, has a great influence upon the morals of man. "Wine and meat," says Plutarch, "enfeeble and enervate the energies of the soul."

"Let those," says Galen, "who do not think that a diversity of regimen renders some temperate and others dissolute, some chaste and others incontinent, some brave and others cowardly, these mild and those quarrelsome, these modest and those presumptuous; let those, I say, who deny this truth, come to me, and follow my advice, in regard to aliments and drinks. From an attention to these principles, they will obtain a great support for moral philosophy; they will feel the energies of their souls augment; they will

acquire a stronger genius, a better memory, and more prudence. I will inform them what drinks, winds, and temperatures they ought to choose or avoid.”\*

Hippocrates, Plato, Aristotle, and many of the ancient philosophers, possessed a similar opinion upon this subject. There is nothing more essential, and, nevertheless, more neglected, than good morals, whether we consider public utility and the prosperity of a nation, or only our own health, the most precious gift of nature.

To follow the general and common rules of life, to observe a regimen analogous to the climate, season, temperament, and the profession one follows, is sufficient to maintain the harmony of the functions in the other ages. In the following section, I will give the general precepts which concern the different states of life. Here I will take a view of cold old age; happy if I can contribute to soften the evils attached to this last stage of existence.

That brilliant epoch of man, in which he has acquired the compliment of the organization and of the energies, and in which life seems to be stationary, is only, as it were, an individual point, a fugitive moment, which flies away in an imperceptible manner, and which nothing can stay. As soon as man has attained his point of perfection, he necessarily declines, and after having shone with the eclat of youth, and enjoyed the pliancy and flexibility of his organs, he sees the roses of spring insensibly decay, and his body acquire by degrees, that rigidity and that induration, which, consuming the energy of the vital flame, slowly leads on

\* Charterius, tom. v. p. 457.

to his dissolution. We may, consequently, refer the first period of old age to that in which the age of consistency commences, although at this period the decay is still imperceptible.

Old age is earlier among women than among men; but it is also slower in its progress. The mode of existence in the different ages is not the same among women, that it is among men; the woman has one peculiar to her sex, as soon as she arrives at that period of life, in which the organs of generation begin to enter into action, and which vary in the other periods, according to the laws of her organization.

"All is life in woman," says Roussel, "at the time of puberty; her eyes previously inexpressive, acquire brilliancy and expression; all that the airy and simple graces possess of sprightliness, all the bloom of youth shines in her person. From this new state results a superabundance of life, which seeks to diffuse and to communicate itself. She is informed of this necessity by tender inquietudes, and by sudden emotions, which are only the tyrannic and sweet voice of pleasure. To powerfully interest all nature in her situation, she seems to call pleasure to her support. When the views of nature are accomplished, she seems to neglect the means, by which the end has been obtained. Woman loses by degrees, her bloom; that delicate flower of the temperament, which only accompanies youth, disappears as the morning dew. The energy from which the organs draw their color, and their seducing form diminishes and is less active, and a disagreeable flaccidity would succeed the pliancy and the elastic firmness, with which they were endowed, if that degree of corpulency, which ordinarily accompanies

adult age, did not support and impose on them by a certain air of freshness. If this new modification is incompatible with the sprightliness, the delicacy of the features, and that flexible shape, which accompanies the age of puberty, it admits at least, majestic graces, and an agreeableness, which without being so impressive, does not fail to become, sometimes, a snare to love. In the mean while, nature endeavors to draw an advantage from and benefit the species by it. She re-animates the lustre of women by intervals; she causes flowers to spring up under her feet, from which she may gather new fruit. But, finally, she can no longer guard off the destructive impressions of time, and acquitting herself from all claims towards her species, she abandons her, to permit her to employ the last moments she has left to her own use.

“Old age, which is always earlier among women than men, does not immediately succeed, the period in which she ceases to bear children. There is still a space of time, but doubtless very short, in which she interests us, by the remaining attractions which recall to memory those that she no longer possesses. She doubles her efforts to preserve this precious and useless remainder. She collects around her, all her arts, to arrest the ravages of time, which daily deprive her of some remaining attraction. But if she extends her cares farther than a legitimate desire to make an honorable retreat requires; if she listens too much to this instinct which permits her to view no other advantage than the happiness of pleasing, it is to be feared that old age, about to overtake her, would exhibit the disadvantageous contrast of her pretensions, and of her inability in too conspicuous a manner.



“When, finally, that period of life, which an author calls the *hell of women* is arrived, the vital impulse which animates all her organs, concentrates in the interior, and is scarce perceptible in the exterior parts; the corpulency which served to support her is dissipated, and abandons her to her own support. Whence a general contraction takes place, which disfigures her by the same means that it formerly embellished her. Among the wrecks with which she is surrounded, the hair which man loses at an early period is still retained by her, which proves that the organs of the woman never entirely lose the flexibility that constitutes her character, and that having differed in every respect from man, she still declines and grows old in a peculiar manner.” (*Système physique et moral de la femme*, page. 82 to 86.)

We should distinguish two periods in old age. Green old age, *senectus cruda*, which commences between forty-five and fifty; and decrepit old age, which manifests itself in an unequivocal manner about the sixtieth year of life. The regimen which is proper in the first, should be such as retard the progress and render the concentration of the energies slower, without diminishing the force of the vital principle. In this age strong liquors, stimulating seasonings, and violent exercise should be interdicted, and every thing that can excite strong passions should be avoided. It is proper to diminish the nourishment, especially the evening repast, and only to use viands that contain a small quantity of gluten, and which are light and very tender; bread well fermented and well baked, and nourishing vegetables. Farinaceous, viscous, fat and heavy aliments should be entirely banished from the



regimen of old people. Wine, which has been justly called the *milk of old men*, is very proper for them; but it should be of a middle age, not containing much tartar, and be taken in moderation. The tepid bath is also of the greatest efficacy to retard the induration, and to facilitate the secretions, and especially the perspiration, which is much diminished at this age. Consequently, it has been recommended in all ages of the world, even in the most remote antiquity, as is proved by the example of Nestor, in Homer. This aged hero bathed before a repast, and after one slept. Hippocrates also advised the bath for old people, and this doctrine, adopted by all the celebrated physicians of a subsequent date, is conformable to that of the moderns.

In proportion as we advance in life it is proper to live soberly, and temperately, and to establish a regularity in the functions. Eating, sleep, exercise, and rest, occupations, and the excretions, ought all to be regular, and to succeed each other constantly in an uniform manner.

Passive exercise, such as riding on horseback, or in a carriage, is the most useful; woolen shirts, worn next to the skin, and frictions are also very salutary. Lastly, in old age we should avoid the impressions of cold, and the effects of copious evacuations, such as bleeding, active purges, copious sweats, unless their use is indicated by particular circumstances; when they are required, they should only be used with prudence and moderation, for they exhaust the little remaining force, and augment the desiccation.

Decrepit old age, ought to be considered as a disease, the crisis of which is death. At this period the

body is bent forward, it is incapable of action, the physical and moral senses are nearly extinct, the functions no longer operate with ease, the humors are acrid and badly elaborated, the solids rigid, and the vital sensibility almost entirely concentrated in its principal centres. When man has reached this point of degradation, he cannot hope to avoid the fatal period; the cup of life is nearly exhausted, and in despite of all the pains and all the precautions, a mild and gentle death will soon deliver him from a painful burden, and terminate his evils and his misery.

In this last period of old age, we advise the same regimen as in the preceding. The quantity of nourishment should, however, be lessened, and the number of meals increased, using fortifying, tonic, and soft aliments, and entirely abstaining from the use of the bath, which, by augmenting the debility, would more rapidly consume the vital heat. It is in decrepit old age that the fourteenth aphorism, of the first section is applicable. *Senibus autem paucus color; propterea paucis fomitibus indigent, a multis enim extinguitur.\**

The love of life, so natural to man, has induced persons in every period of the world, to imagine or propose divers methods to prolong it beyond the term

\* Many authors have written upon old age, and the diseases peculiar to this period of life. Citizen Halle, professor at Paris, has given an excellent treatise on this subject, in the *Encyclopedia Methodique*, art. Hygiene. This learned author writes me, that he forgot to notice the work of Fischer, *de senio et morbis ejus*, which contains many good things, and he requests me to mention this omission, which he intends soon to repair. I seize the opportunity to comply with his request, and take this occasion to pay this man, celebrated for his genius, and his uncommon talents, the just tribute of respect and admiration which his writings have obtained for him, among all the distinguished learned men in the republic of letters.

fixed by nature. This has been the object of the researches of ostentatious adepts, who, by means of their elixirs, their metallic tinctures, and other compositions, better calculated to shorten existence than to lengthen it, promising to their proselytes, a life of many centuries, and even immortality. It were useless to refute such absurdities.

The premature death of these ridiculous characters, prove how much faith should be placed in their promises. Man, as well as all living beings, is born mortal, and if there be a mean of prolonging the course of life, it consists in sobriety and temperance, also in the regimen proper to the ages, constitutions, and climates; all other means are futile, and frequently more injurious than beneficial, and ought to be rejected with the pity or contempt which the inventions of foolish persons and knaves inspire.

SECT. 5. *Regimen of the sex.*

Women have a constitution very analogous to that of infancy. They have a greater softness of cellular tissue than men, and consequently, an inexhaustible fund of sensibility, which increases the eccentricity of the energies; the extraordinary sensibility between the womb and all the organs, especially the stomach, and the sedentary life peculiar to them, establishes, as I have already said, essential differences between women and men, as well physically as morally.

It thence results, that in order to prevent the nervous affections to which the constitution of women predispose them, their regimen ought to be very similar to that of children, and that they should not use stimulating and heating substances, such as strong seasonings, coffee, liquors, but only use aliments of easy

digestion, especially white meats and vegetables, which will not concentrate the action too much, nor occasion nervous diseases. They should also subject themselves to dietetic regulations relative to temperament, age, seasons, &c. As to the different states of women, which require particular precautions, I will speak of them in the course of this work.

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## CHAPTER X.

### *On Education.*

It is in infancy that the foundation of a good or bad health is established; and the most fruitful source of the infirmities that render life miserable, is not only found in the errors of the authors of our days, but is more especially owing to the vices of education. In fact, the best constituted children, soon degenerate from these causes, and become feeble, languishing, and a prey to pain. These evils accompany them through life, and frequently terminate their existence at an early period.

In general, an European education is as bad as it can be; it only tends to degrade man as well physically as morally; to enfeeble his body, to render him a valetudinarian, to enervate the energies of the soul, and to mutilate its faculties. Nature has been censured for these disorders, whereas her efforts tend to the preservation and happiness of the being to whom she gives sensation and life!



Nature has especially confided the care of the first education to women. This charge, is to the mother a sacred obligation of which she cannot disfranchise herself, without committing a crime, and it is to the observance or infraction of it, that principally depends the happy or unhappy condition of man.\*

The maternal duties begin at the period of conception. As soon as the woman thinks she is pregnant, she ought, for her own preservation, and for that of her fruit, to moderate her desires and her passions; to exercise proportionate to her energies, and to subject herself to a regimen conformable to her age, constitution, condition, &c. There is a general plan of conduct proper for all pregnant women, which consists in: 1. To live in a pure, serene, and temperate air, *i. e.* one which is not damp nor charged with unwholesome vapors. 2. To make moderate use of aliments easy to digest, and to avoid salt and seasoned meats, pastes; in a word, all tenacious, heavy, and compact substances. During gestation, women should be more sober and temperate than in any other state. Moderation in all things is the most certain means of dispensing with a recourse to remedies, and of preventing the causes that render them necessary. 3. They ought to drink but little wine, and that rarely without water, to abstain entirely from strong liquors, and to take coffee but seldom, for the habitual use of this drink has sometimes occasioned abortion. 4. Ex-

\* "To the care of women," says J. J. Rousseau, "depends the first education of man; on women depends also his morals, passions, tastes, pleasures, and even his happiness. Hence, to raise man while he is young, to attend him when he has arrived at maturity; to counsel him, to console him, to render his life agreeable and pleasant, have been the duties of women in all ages."—*Emile*.



ercise upon horseback, in a carriage, dancing, violent and laborious work, have frequently been fatal, walking and moderate exercise are not only useful, but really indispensable.

5. Pregnant women should not continue awake longer than usual, but ought, on the contrary, to sleep more. 6. They should preserve a calmness and tranquillity of mind, to divert it agreeably by light amusements; but immoderate desires and strong passions should never find a place in their breasts. 7. It is important that they abstain from bleeding,\* emetics, and purges, which ignorance formerly considered as necessary in gestation, and of which interested charlatanism attempts still to preserve the use; there are but few cases in which these means can be proper. "They are rather remedies against the effects of a bad regimen than against gestation, which is not a disease.

\* \* \* \* The female animals, and women whose constitutions have not been depraved by effeminacy, are not patients during gestation. Pregnancy is only a disease among women whose enervated organs render all the functions laborious; among those frail and delicate machines, in which each digestion is a short disease. The former most generally arrive to the term of their pregnancy, without any other infirmity than those inseparable from this state."†  
8. The dress of pregnant women ought to be loose.  
9. Lastly. They should moderate the venereal de-

\* I shall not embark in a controversy which has been warmly handled on this subject. I doubt not, however, that much good does often accrue from bleeding in pregnancy. The luxuries and effeminacy that are introduced into civilized society are causes of a multitude of diseases, and however much we may admire the theory of our author on this very important subject, we know his doctrines will not be complied with.—*Tr.*

† *Système Physique et moral de la Femme*, par Roussel, pages 290, 291.

sires, and but rarely enjoy the pleasures of love. In that natural state, in which man is not depraved either by the blessings or evils of society, his wife seeks him as seldom as he does her. The half civilized nations of America, never know their women during gestation, and this is very probable, says De Pau, (*Recherches sur les Americains*,) one of the reasons, why there are so few deformed children among them. Deformity depends more than we suppose on brutal inconstancy. This is, no doubt, one of the causes, why the mortality of lying-in women among the savage nations is less than in Europe. "In taking the European countries one with another," says De Pau, "we find that out of one hundred lying-in women, more than one dies; and in America, out of a thousand, only about the same number die."

The circle of maternal duties increases and extends to the period of delivery; it is at this period that the child imperiously claims the succor of its mother. Nature has decreed, that she should administer them herself, and forbids her confiding such important cares to foreign hands. She ought to give it her breast, and she cannot with impunity deviate from this law of nature, which has been imposed upon her as an obligation, for even before delivery she had elaborated and prepared two fountains of milk, to serve the new born for nourishment. It is only in cases of physical impossibility, such as bad health, a milk of a bad quality, or a disease that might be transmitted to the child, which should induce the mother to dispense with the duty of suckling her child. Under other circumstances, it is her sacred duty. Moreover, the milk which she refuses to her child, is transform-

ed into a fatal poison, which becomes an inexhaustible source of pain and torment to the mother. Guilty towards the being to whom she has given birth, the cries of her conscience will soon avenge outraged nature, the sufferings of her body, and the remorse with which her soul is tortured, will induce her to view as a blessing, the death which she has caused it.\*

In addition to the physical evils, to which a woman exposes herself, who refuses her child the breast, how many future privations does she not prepare for herself? Has not this cold and sad indifference, which is mutually experienced by those two beings, whom nature has destined to be united by ties of a reciprocal love, its origin in this treatment? (for these ties are broken by the woman, who is only half a mother.) This motive should be sufficient, without enumerating a number of others, to induce her to do her duty. But let us hear what Phavorin says upon this subject; this philosopher being called to visit a senator, whose wife had just made him a father, addressed him in this language: "Your wife, no doubt, proposes to

\* The mother who disfranchises herself of this duty, generally pays very dear for this offence against the law of nature. The milk of which she has the cruelty to deprive her child, communicates indistinctly to all the organs, and produces the most serious consequences. Women have been seen who have lost their reason, others their sight, hearing, &c. in consequence of the deposit of the milk in some part of the brain; apoplexies and palsies have also been frequently seen produced by this cause. The obstructions of the viscera, consumptions, whites, ulcers in the womb, puerperal fevers, and many other affections not less serious, are often occasioned by the milky humor diverted from its proper source. Those who escape these diseases, have not less cause to complain; their pregnancies multiply and produce a multitude of nervous affections, the necessary effects of the excessive irritability of the womb. Consequently, it is not rare to see blooming young women who were corpulent and healthy, lose all these blessings in four or five years after marriage, and drag to the tomb a languishing and miserable existence.

suckle her son herself. Oh! exclaims her mother who was present, it would be death to her, if, after the pains of delivery, she had also to support the fatigues and weariness of suckling the child. Ah! pardon me, Manlia, replied Phavorin, permit your daughter to be the entire mother of her child. To be only half a mother, to give birth to an innocent being, and afterwards to refuse to take care of it, is an odious act, and one accursed by nature. Whilst this being was forming, and enclosed in your womb, you nourished it with the purest of your blood; what fatal incorrect inferences induce you to refuse it your breast, now it is before your eyes, now its carresses and its cries claim the tenderness and inviolable rights of maternity!

“Do you suppose, Manlia, that these seducing globes, which belong to your sex, have been fashioned by the hands of the graces, to serve only as ornaments? Do you not know that nature has given them you for the nourishment of the infant? May the gods preserve me from applying what I have to add to you! But, finally, have you not seen execrable women, frightful monsters, who, for fear the abundance of milk would injure their breasts, use every means to dry up every drop of this sacred fountain, the first aliment of the human species, at the risk of perishing themselves! I speak of the abominable refinement of coquetry, which induces women to have recourse to certain drugs, to produce abortion, in order to relieve them from the inconvenience of gestation, the pains of delivery, and especially to prevent the disagreeable form, which the contraction of an abdomen that has been distended for some months, may produce.



“But if it is an odious attempt, and one deserving the execration of the whole earth, to endeavor to destroy an innocent being in the first moments of its life, to stifle it, as it were, in the arms of nature, who has began to form it, do you think it is less so, when it has acquired its perfection, when you have given birth to it, when it is your child, to cruelly refuse to give it that nourishment, which is destined for it, and to which it has been so long accustomed? Ah! of what importance is it, exclaim some, what kind of milk it sucks? Why dost not thou add, also, Father of nature, what is it to me of what blood my son be, and in what womb he receives life. For, in fact, this precious liquor, which the abundance of animal spirits, and the interior fermentation have formed and whitened, is it not in the breasts the same blood which has served to form the child in the womb of the mother? Does not this blood, which, after having animated man in the maternal womb, ascend to the breasts, at the moment of delivery, by an admirable economy of nature, and there becomes established for the support of the feeble commencement of a frail existence, to furnish to the new born a mild and common nourishment.

“Consequently, philosophy proves, that if the quality of the blood has an influence upon the organization of the body, and on the temper of the mind, the virtue of the milk and its qualities absolutely produce similar effects. This is observable not only among men, but also among animals, and even in the vegetable kingdom.

“Have a lamb suckled by a goat, or a goat by a sheep, the wool of the one will be coarser, and the



hair of the other finer. See two plants, two trees coming from the same germ, what difference in the taste and in the quality of the fruit, if one is planted in the best earth, and in contact with water that nourishes it, and the other is not. That tree, which in full vigor and bloom, constitutes the ornament of the hill, has it not been seen to dry up and perish after transporting it, for the want of proper nourishment.

“What madness then, and what abuse to abandon, as it were, to the breast of a mercenary wretch, the dignity of the soul of the newborn infant, and the vigor of its temperament, at the risk of seeing the one corrupted, and the other enervated by the milk of a stranger, of an inferior character; especially if the nurse who takes the place of the mother, is a slave or of a servile race, if she is of a barbarous nation, if she is wicked, deformed, a libertine, or given to wine or strong drink? And, on such an occasion, the first woman who offers, is taken without distinction.

“Shall we then, Manlia, suffer this dear boy, which is yours by consanguinity, and which I presume to call mine by the tender affection which I possess for his father, my illustrious disciple, shall we suffer this child to be the victim of so pernicious a custom? Chaste matrons, you are disconsolate with seeing children degenerate! Permit me to tell you, it is your fault; you ought to have transmitted to them, with your milk, the purity of your morals, and the strength of your constitutions. It was with justice that Virgil not only reproached Enead with his birth, as Homer did Achilles, but also spoke of the monster which nourished him, when he said: ‘Yes, barbarous

wretch, thou sucked the milk of a tygress of Hyrcania;’ for he knew that the character of the nurse, and the quality of the milk, almost solely determine the inclinations and propensities of the person nursed.

“Young spouse, if all these dangers make but a slight impression on you, suffer at least the dearest interest of your heart to awaken and move you. Remember well that the mother, who abandons her offspring, and gives it up to a stranger, breaks the mild chain of affection and love, by which nature attaches the soul of the child to that of the mother, or at least, that this conduct extremely weakens and relaxes it; for from the time that your eyes no more see the son, whom you have exiled, you will gradually feel decline that sacred flame of maternal love, of which nothing deprives the impetuosity and energy in the heart of a true mother, and it will finally become extinct. You will no longer hear these continually renewed murmurs of inquietude and tenderness, and the remembrance of an infant given to a nurse will be effaced almost as soon as if death had snatched it from your arms.

“But nature is not slow in avenging herself for this outrage. The child, on its part, only knows the breast which it sucks; its sentiments, affections, caresses are all for the nurse. The real mother gathers but the fruit of indifference and forgetfulness; so that all the impressions of blood, all the germs of filial love having been stifled in its heart from the morning of life, if it should afterwards be seen to testify some attachment for the author of its days, it is not guided by the dictates of nature, but is a demonstration of pure

civility. It depends almost entirely upon matter of opinion, which assigns certain persons for its parents."

I will pay no further attention to this subject, which has been eloquently treated by J. J. Rousseau, and by many distinguished physicians. I will limit myself to presenting some general reflections upon education, and to representing the vices, which occasion the depopulation and decline of the human species.

The principal errors that are committed in the education of children, consist in the great number of coverings and clothes, in which they are enveloped, in the pernicious use of swaddling clothes, in the great quantity of food with which they are pampered, in the medicines which they are made almost always improperly to take, in the effeminacy in which the greater part of opulent parents live, in the pernicious passions which they excite or foment in them, and in premature studies.

The vulgar imagine that a new born child cannot be kept too warm; and to preserve it from the intemperance of the air, they envelope it with flannels, swaddling clothes, stay bands, and keep it constantly in very warm apartments; it thence results, that in a very short time, the child can no longer support the air, and that, how little soever exposed, it contracts a catarrh or cold.

This custom is, as we see, very prejudicial, and renders the person incapable of supporting, without danger, for the remainder of life, the sudden changes of the atmosphere, which are so frequent in our country. There is not, however, much to be feared from the effects of cold, as regards children, for

experience proves, that under other similar circumstances, they can endure it better than adults; they have, consequently, less need of warm coverings and clothes. But those who have the care of them, are not satisfied with overloading them with these. No sooner are they born, than their hands and feet are confined, and they are treated as criminals, although they have committed no other fault, than that of coming into the world.\* They are bound, compressed, and their bodies so enveloped with linen, that they can scarcely move. Consequently, nothing is more opposed to the development of the members, and to these acquiring the necessary energies, than the defect of inaction, to which the child is condemned. Is it then astonishing, that such children should be feeble and without vigor?

Another inconvenience which results from the compression of these bandages and swaddling clothes, is the deformity which it occasions. At this age the bones are very soft and very flexible, similar to wax; they easily give way, and contract a bad shape, which it is afterwards very difficult to remedy. This is the reason why a great many persons, born without any vice of conformation, have the shoulders elevated, the spine curved, and the breast flattened, and the most of whom perish with consumption; add to this, that the child thus bound, endeavors to free himself from his confinement, and that in consequence of the crying and agitation, it contracts forced attitudes,

\* *Itaque feliciter natus jacet, manibus pedibusque devinctis, flens animal, cæteris imperaturum, et à suppliciis vitam auspiciatur, unam tantum ob culpam, quia natum est. Plin. lib. viii. in præmio.*



which not only occasion deformities, but also frequently hernias. Besides the compression which the body experiences is also injurious to respiration, and to digestion. Hence, it is not rare to see many perish from this cause in consumption or convulsions. What I have just said of the swaddling clothes, is also applicable to the stays, which they wear after infancy, to give them a good shape; they produce the same effects, and are equally fatal.

But of what importance is it, especially for the daughters, whether it be at the expense of health or life, provided they can please! They, however, deceive themselves. All these pretended means, to form the shape, and to give graceful appearances, ordinarily produce, as I have already said, greater and more dangerous deformities than those which they are intended to prevent. Moreover, the machines invented by the orthopidistrs, to remedy the deformity of children, very generally the effects of swaddling clothes and stays, frequently occasion new ones, without curing those for which they are employed. The only method to prevent these vices of conformation, is to imitate the savage nations, who know neither swaddling clothes nor stays, and among whom we meet with scarcely any deformed or mutilated persons. Let us attend to nature, the animals have only her for their guide, and we see but few lamed or disfigured, in the different species of them.

It would be fastidious to enter into minute details respecting the manner of clothing children, and the different kind of clothes which are proper for them; they ought to be varied according to the country or season. As to their shape, which is generally regu-



lated by the caprices of fashion, or the taste of the parents, it does not influence health. The only rule to follow is, that the clothes of children be not too warm, and that they be so made as not to be in any respect too light, nor compress the body, so that all the motions be free. Collars, garters, waistbands or girdles, buckles, and in general, every thing which can compress or confine, should be proscribed; for they by these effects, injure the circulation, cause the humors to stagnate, and occasion a preternatural determination of blood to the head and breast. The head should be thinly covered, and as the hair grows, the child should be accustomed to go without a cap, so that at the end of a year it may go bare headed. "The ancient Egyptians," says J. J. Rousseau, (Emile) after Montaigne,\* "always had the head naked, the Persians covered theirs with thick head dresses, and also with the thick turbans, the use of which, according to Chardin, the air of the country renders necessary. But, we know the distinction already made upon the field of battle, between the skulls of the Persians and those of the Egyptians. How important it is then that the bones of the head become harder, more compact, less fragile, and less porous, the better to arm the brain, not only against wounds, but also rheums, defluxions, and all the impressions of the air; accustom your children to remain summer and winter, day and night, always bare headed. But if for cleanliness, and to keep the hair in order, you wish to give them a head dress for the night, let it be a thin cap, of open work, and similar to the nets in which the Basques envelope their hair."

\* Essay of M. de Montaigne, page 194.

Before the child walks it is useless to give it shoes. It is not until it begins to make use of its legs that these become necessary. It may then wear laced shoes, or, what would be still better, *sabots* of light wood.

It is proper to place the child during sleep, in a cradle, with a single shirt, without being bound or tied, upon well dried linen, which should be changed as often as it becomes dirty, for cleanliness is one of the most efficacious means to preserve health; and it should be covered lightly.

The nourishment of a child is not less important than its clothing; we should in this, as in all other respects, take nature for our guide, and never grant it more than necessary. The mother should present her breast to the child, as soon as it shows a disposition to suck. The first milk that the breasts secrete soon after delivery, is a thin acidulous serum, called *colostrum*, which purges the infant and promotes the expulsion of the *meconium*, which is collected in the intestines of the child during the whole period of gestation. We easily conceive, that when the child is deprived of this first milk, it is exposed to the fatal diseases which the *colostrum* has the property of preventing. Hence this substance is a remedy prepared by nature herself; but, if the child by sucking receives this benefit from its mother, it pays her for it, by relieving her in her turn, from a superabundant milky humor, the abundance of which if retained in the breasts, extends and swells them, and frequently produces very acute pains and other grievous accidents.

Many women are in the pernicious practice of giving their children, immediately after birth, cordials,

and especially wine,\* to remedy, they think, its weakness. Nothing is more injurious than this practice, and it is only in cases where children are born with symptoms of apparent death, that it is useful to employ these means to excite the energies of life, and reanimate the circulation. It is equally dangerous to give them purgatives, which only disturb and disorder the functions. Nature has provided means to expel the *meconium*; the first milk of the mother is sufficient for that purpose, and when deprived of it, a little honey water is the most proper, and fulfils the views of nature better than the drugs which are offensive to it. Another error, not less prejudicial to the child, is that of giving it narcotics, as laudanum, syrup of poppyrs, or other preparations of this plant to make it sleep.

These medicines are real poisons, which confine the play of the nerves, blunt the sensibility, disturb the order of the functions, cause a determination of the blood to the head, and frequently leave a fatal and permanent impression on the organs of sense. They can only be useful in a few cases, and a physician should prescribe them.†

\*In this country, parents and nurses are in the pernicious practice of giving the young child, a mixture of spirit, sugar, and water, called toddy.—*Tr.*

† Real physicians have not much confidence in drugs, and are not polypharmics. Unhappily for humanity the number of these physicians is not great, especially in the German countries; prejudices are so great there, that they do not suppose they are capable of curing any disease without the remedies which are prepared in an apothecaries shop, and the people measure the knowledge of a physician only by the length of his prescriptions. On the other hand, many officers of health believe, that nature is impotent, that she is not capable of preventing diseases, and that they must rectify her errors and direct her. These sublime doctors, consequently, load their patients with remedies. Two or three portions of jalap, one or two stimulating pills per day, and in addition to all these, half a dozen glysters, without speaking of bleeding, and purges, which they give indiscriminately during the

The mother's milk, when well constituted, is ordinarily sufficient for the child during the three or four first months, and it is rare that it is necessary to give it any other aliments. Before this period, the stomach is not capable of digesting any other nourishment than the milk which is by nature destined to nourish the new born; it is an aliment proportioned to the weakness of the digestive organs of the child, to the degree of action which the digestion should excite throughout the system, and to furnish the quantity of nourishing juices proper for its growth. The child requires but little aliment in the first months, and mothers as well as nurses, commonly err in this respect; they imagine the child is hungry every time it cries, and present it the breast ten or twelve times a day. This is an error of the most dangerous kind, for an infant never cries except when it suffers; or when something wounds it. Hunger at first does not produce pain, and when the child wants the breast, it testifies it by unequivocal signs, previous to crying.

It is not only by the too great quantity of aliments, but also by their bad quality, that errors are committed in the regimen of children.

Paps made with unfermented meal, panadoes sea-

whole course of the disease; such is the practice of these jugglers, whose doctoral caps, only serve to hide the ears of Midas. *Siagnare, purgare et clysterium donare*, such is the basis of their treatment in all diseases; consequently, one may almost always count the number of their patients by that of their deaths, and those whose constitutions have resisted the disease and the physician, are subject to relapses, or have long and tedious recoveries.

Foolish beings who wish to command nature, and dictate to her laws, command also the elements and the seasons! Cause it to rain or be fine weather. This were less difficult than to rule animated nature, and to reign despotically over her with drugs! *Risum teneatis amici!*



soned with sugar and spices, preserves, pastery, &c. should be entirely prohibited. The first produces griping pains, cholics, diarrhea and convulsions; and they all excite the appetite too much, the child thence becomes fat and bloated, which is not as generally supposed, a sign of health; for children who are very fat, are more subject to spasmodic affections and convulsions, suffocating catarrhs, or croups, &c. than others. Simple aliments, but those that are light and easy to digest, are the only nourishments that are proper at this age, owing to the weakness of the digestive organs. Well fermented and well baked bread, is the most proper aliment. Cow's milk may be added to it. Warm milk may be poured on bread that has been boiled in water; the water should be drained from the bread, and the milk must not have been boiled. When the child is upwards of six or eight months old, it requires a more substantial nourishment; it is then proper to give it bread in meat soup, two or three times a day; but it should not be permitted to eat meat until it is weaned, and has teeth for grinding, and even then in very small quantities. The vegeto-animal regimen, becomes necessary at this period, for if the child only use vegetables, as has been advised by some authors, who have consulted their imagination more than nature and experience, it will be exposed to acidity and the accidents depending thereon.

In proportion to the growth of the child, it is necessary to increase the quantity of the nourishment. When it is weaned, it should be fed four or five times a day, but never during the night. The quantity of nourishment should be relative to the necessity, and when the aliments are simple, it is rare that more than



necessary is taken. It is necessary, however, not to be too sparing as some imbecile parents are, who fear that their children will become stupid. This excess is still more dangerous than the contrary, for the consequent decay is almost always fatal, whereas nature more easily remedies the diseases depending on repletion.

Fruit is very useful to children, hence they are very fond of and prefer it to all other substances. But they should only be permitted to eat that which is ripe, and should not be indulged in too much even of this. Too much fruit is injurious, but unripe more particularly so, it debilitates the digestive forces, produces acidity, flatus, and engenders worms.

So soon as the child has attained the third year of age, if it possesses a good constitution, it should be accustomed to the use of all kinds of vegetables, but with moderation, and to augment insensibly the quantity of viands, especially those that are gelatinous.

It is necessary that their regimen be much varied, but simple, and that they should not be subjected to any one kind of nourishment. We have been advised not to give them legumes, farinaceous plants, roots, and other; acescent substances. This advice is only important in respect to feeble children, and those who are valetudinarians, for experience proves that these aliments are, on the contrary, very useful to healthy children, in consequence of the tonic impression which they impart to the stomach, and which is usefully communicated throughout the system. A very relaxing and watery diet produces the contrary effect, and throws the whole system into a radical enervation; it

predisposes to rickets, scrophula, and other diseases of this kind, and should be generally rejected.

Dentition or teething is frequently a critical period, being accompanied with diarrhea, cholic, convulsions, and high fever, which is frequently fatal to many children. However, it is not consequently a disease, for we see children who do not experience any of those accidents, and among whom the eruption of the teeth takes place without any disease, at least in a very sensible manner: which demonstrates that these morbid affections are not necessarily owing to teething, they, in fact, generally depend on plethory, on the acidity of the gastric juice, and particularly, on the too great mobility of the nervous system. They may be efficaciously prevented by subjecting the child to the regimen of which I have just spoken, and which experience proves to be the most consistent with the views of nature.

I have explained the manner in which children should be nourished, when the mother is unhappily unable to do it herself, and have said that there is less to be feared from giving them the milk of animals, than from confiding them to mercenary nurses, at least, when the morals of these are not known, when they are not attentive to follow the wishes of the parents, and when not entirely under their inspection. I have also prescribed the precautions necessary to be attended to in the choosing of nurses; hence, will not recur to this subject. I will only observe, that one ought to be preferred who is moral, who possesses good health, has a plenty of milk, is cleanly and careful. If to these qualities, she unites the age, character, and physical constitution of the mother, if her

milk is fresh and similar to the mother's, she is the most suitable as a nurse. I will also observe, that she should never give the breast to the child immediately after strong emotions, such as anger, a fright, or a lively transport of joy; for experience has proved, that many children have been attacked with convulsions or other affections, from having sucked when the milk has been corrupted by such circumstances.\*

It were useless to put in practice all these precepts, if the exercises, the desire of which is born with man, be neglected; without these the constitution of the child never can become strong, but it must always remain in a feeble state. The rickets and scrophula depend most frequently, upon the inaction and state of constraint, in which the child is kept. The child is naturally disposed to exercise, but as it is incompetent to do so in the first months, it is necessary to charge the nurse with this care.

The most proper exercise for children before they walk, is to carry them in the open air. Their position should be frequently changed, to prevent them from contracting a habit of inclining more to one side than the other, as this would finally occasion a deformity in the spine, and in the side habitually inclined. The manner which most of the nurses carry children, is very bad; most commonly only one thigh

\* I am well acquainted with a lady who took those precautions without the desired result; she was very much alarmed, and kept her child from sucking, not only during the fright, but for some considerable time after she became quite composed. However, the milk which was secreted previously to, and during the fright, when sucked by the child, had a very active influence; it produced convulsions, &c. It is, therefore, in such cases, necessary to draw off the milk, after the system has become composed, and not to let the child suck until nature has provided a fresh supply.—*T.*

rests upon the arm, and the thigh as well as the leg of the other side being abandoned, they contract a bad shape, and the foot turns inwards. Others bring the arm on which they carry them, too near the breast; hence the knees of the child are pressed against the breast, and the thigh giving way on this side, contracts a bad shape. The best method to carry a child, is to hold it upon the arm, so as to support its back against the breast of the nurse, as against the back of a chair; in this attitude, the child has a point of support behind, and none of its members contract a false position.

Another not less useful kind of exercise in the first months after birth, whatever its opposers may say against popular usages, is that of the cradle. The frequent renewing of the air, the gentle commotion of every part, and the reciprocal action of the viscera upon one another, which this exercise procures, necessarily make a salutary impression upon the organs of the child; add to which, the rocking is a powerful means of diverting the suffering infant, its pains being only of the body, and not of the mind; it blunts the excessive sensibility of the nerves, but does not render it callous; and as De Seze observes, "by procuring a mild, continued, and uniform sensation, it lulls the child to sleep, and thence changes its restless situation into that of inertia and indifference."<sup>\*</sup>

The child should not be pressed to walk; this exercise should be deferred until it is weaned, about the ninth or tenth month, and when its lower extremities have acquired a sufficient strength to support the body.

<sup>\*</sup> Recherches sur la Sensibility, p. 137.



It should be supported by the hand. The use of leading strings, which makes the child incline forward, and renders it crooked, ought to be proscribed, because in this attitude, the breast becomes the centre on which the weight of the body is borne; it thence results that the breast is forced inward, and the breathing is affected. It were better to let it receive lessons from nature and from experience. Let it tumble about upon the ground or floor; this exercise not only strengthens it, but also learns it to make use of its limbs. It thus begins to walk alone soon enough, without requiring guides or masters. As soon as the child can walk, it should be permitted to exercise itself in the open air, and ought not to be precluded from the exercise and plays of its age. Running, jumping, and other kinds of exercise are absolutely necessary, and the body only acquires strength by these means. It is, however, necessary to make them avoid an excess of exercise, as it exhausts the energies, and occasions serious diseases. Excessive exercise produces the same effects upon children, that premature and immoderate labor does upon countrymen and mechanics; the organs become hard, the body soon grows old, and consequently, is not completely developed, and does not attain its full size.

Dry frictions upon the skin of children, is an efficacious and proper means to render them robust and vigorous. By promoting the free circulation of the energies, they produce the same effect that exercise does. This practice, employed in the most remote ages, and too much neglected in our day, gives play and spring to the organs, promotes their development, confirms the health of the child, and preserves it

from the diseases that depend upon too great a laxity of the solids; its use cannot be too highly recommended.

Lotions and the cold bath are of the greatest utility in the northern countries, (as well as in ours,) where the system has to support sudden variations of temperature. Nothing is more proper to give the organs that vigor, which is necessary to resist these sudden impressions, that determine contrary actions in the system, which rapidly cross and succeed each other. Children should be early accustomed with their use.\* They may be familiarized to lotions and the bath, by at first washing with a sponge, imbibed with cold water, the parts that are constantly exposed to the air, as the hands, feet, face, then the arms, thighs, legs, and gradually all the body. These lotions ought to be repeated two or three times a day; and, lastly, the whole body should be put in cold water.

Sleep is the almost continual state of the new born child; it is necessary to dispose the body to nutrition, and to the development of its parts. Nearly all the first moments are marked by a desire to sleep. But in proportion as man advances in life, this want diminishes; so that in old age he invokes it in vain. In old age he is tormented with vigilancy, and there are but few men, who at this age do not complain of not being able to sleep.

The beds or cradles in which children are put to repose, should, as well as their apartments, be well aired. There is nothing more prejudicial than a contaminated air, and this is only avoided by the free

\* This practice is very salutary in northern countries, but would be injurious in warm situations, as has been already remarked.

admission of the fresh and pure; that of fixing their beds in closets, alcoves, and small chambers, is a very pernicious method. It is, on the contrary, very salutary for them to sleep exposed to the open air, and in apartments where it circulates freely.

Children are ordinarily laid upon their backs; this situation is not the most favorable, and they rarely take it when left to themselves; they naturally lay upon one side, the legs and arms gently folded; this position is the most advantageous, inasmuch as it promotes the greatest facility in the motions of the viscera. When laid upon the back, the action and the course of the humors are interrupted in the head, breast, and belly.

It is proper that children be laid on something hard, such as a mattress, and even upon a straw bed, rather than upon a bed of feathers or wool. A hard bed gives strength and vigor; a soft one enfeebles and enervates. We have nothing to fear from their sleeping on hard beds; for, as the good Lafontaine has very justly observed, "every thing is a bed or mattress for children." This is also the sentiment of J. J. Rousseau: "It is important," says he, (Emile,) "to accustom children to lay badly, by this means they will find no bad beds. Persons raised too delicately, only enjoy sleep upon down. Men accustomed to sleep upon planks or boards, find it every where. A soft bed, in which one is enveloped in feathers or down, dissolves, as it were, the body; the kidneys too warmly enveloped, inflame; thence result the stone and other inconveniences, and, infallibly, a delicate constitution, which promotes those diseases. No bed is hard for him, who falls asleep as soon as he lies down."

In general, it is very essential to accustom children to a hard and active life. It is even desirable that they should sometimes experience privations, and that they become acquainted with hunger, thirst, and especially fatigue. It is good for them to learn at an early period of life, that an appetite is the best of cooks, and the only one that they ought to esteem. These means would contribute not a little to fortify the organs, to confirm the health, and to prolong the duration of life. An effeminate and delicate education produces the contrary effects. Nothing debilitates the system more, nor predisposes to a greater number of diseases and infirmities, and shortens the duration of life more, than wishing to guard children from the least wind, keeping them enveloped in feathers, surcharging them with delicate food, and permitting them the use of wine, coffee, chocolate, and heating seasonings. In addition to this pernicious regimen giving place to an infinite number of accidents and diseases, it hastens, with a morbid rapidity, the development of the organs, which remain imperfect; it has the effect of a hot-house, which produces flowers and fruit in the middle of winter, but which soon destroys the plant or tree that bears them; for, as I have already said, the duration of life is in proportion to the time that is requisite for the growth of the body; so that it is longer in proportion to the slowness of the development, and shorter as the growth is performed more rapidly, and in an incomplete manner.

Gluttony, jealousy, and terror, are passions extremely injurious to health, and the most common in early age. I shall not now speak of their direct and immediate effects upon the animal economy; they will



be noticed in the sixth section of this work. I will here only give some reflections founded upon observations, and which will serve to prove how dangerous these passions are in infancy; they are the cause of a multitude of diseases. The stomach surcharged with aliments frequently of a bad quality, for it is these which children prefer, can only execute its digestive functions with difficulty, and it badly elaborates the juices designed to nourish the body; from this painful and vicious digestion, result sympathetic gastric affections, which introduce disorder in the system, and a greater or less deleterious alteration in the humoral system. Hence, gluttony destroys a great number of children at an early age. It is then absolutely necessary to set bounds to their disordered appetites, and to distribute to them, with a wise economy, none but simple nourishment, and that which is not highly seasoned, in order that the sense of hunger may not be excited beyond the wants of nature. Unhappily, parents are almost always the authors of the diseases of their children, by indulging too much their avidity, or by feeding them with such nourishment as they ought to eat themselves. It thence results, that this nourishment makes too strong an impression on their delicate organs, that it blunts the sense of taste, and causes the child to contract vicious habits, which, by depriving it of the sweetest charms of life, conduct it rapidly to its destruction.

It frequently happens that children insensibly lose their flesh; although the face remains full, the whole back and sides become lean, so that the shape becomes as a spindle. When this kind of marasma occurs without any sensible cause, we may be certain

that it is owing to jealousy, and by paying attention, we shall soon perceive that more kindness is shown to some other child in the family, than to the one thus affected.

Parents and tutors cannot be too careful to remove from the hearts of those under their care, these secret torments, which devour them, and to which a marked difference gives rise. One can scarcely imagine to what degree a child is sensible of these partialities, and how much it dissimulates the chagrin that undermines it; we must often conjecture it. To succeed in discovering it, it is necessary to carress the others less, and to testify a greater degree of friendship for it than customary, when, if his eyes are attentively observed, we shall discover if he is tormented with jealousy; for if this passion has found access to his soul, his eyes will become more serene, and he will cease to be sad and thoughtful. In this case, it will be necessary to retrench, in his presence, the attention which is paid to the others, and to pay more to him, but in such a manner, as to prevent the stratagem from being perceived; for children are more penetrating than they are generally supposed to be; they read the minds of those near them; nay, we are frequently their dupes.\*

That children are [susceptible of jealousy, is an unquestionable fact; they even possess this passion when at the breast. "I have seen," says Augustin, "a jealous child, who was not yet able to speak a word, but who regarded another child who sucked

\* *Orthopedie par Andry, p. 157.*

with him, with a dejected countenance and an irritated eye.”\*

Weak and sensible beings are naturally timid and fearful; fear easily invades their minds. Consequently, this passion is peculiar to children and the female sex. Unhappily we cannot sufficiently fortify children against this passion and its dangerous effects, which sometimes subsist during life, render them miserable and full of agony and distress. Women carried away in the vortex of pleasures, frequently confide the care of their children to domestics, who frighten them with the relation of absurd stories of what is to happen, of devils and witches, from which the most dreadful accidents result. A child naturally curious, repeats with avidity these relations, and in a short time, its perturbed imagination presents it with nothing but spectres and terrible phantoms; it no longer dares to commit itself to the darkness of the night, the least noise frightens it, palpitations, fainting, convulsions, and sometimes sudden death is the consequence. In fact, such is the influence of this cause upon the mind of the child, as to destroy the energy of the soul, and render it weak and pusillanimous through life. We thence see that it is improper to suffer children to be attended indiscriminately by all kinds of persons. Their character is greatly influenced by the impressions which they receive in an age, when the brain is, as a soft wax, assuming every form that is given it, and disposed to retain the impression in an advanced age.

We know that the dispositions of persons with

\* Education des Enfans, par Fenelon.

whom we live, considerably influences ours, and that we are gay, sad, silent, &c. according to the company with which we associate. It is the same, and in a greater degree, with children; it were desirable that they should never be in company only with persons who are cheerful and informed, and who know how to mix the agreeable with the useful, in order that they may acquire this character, and that they may be instructed.

The study of languages and of the abstract sciences, should never be commenced until an advanced period, when the child has acquired a sufficiency of vigor; the mind should never be formed at the expense of the body, and the intention of nature is, that this be fortified before the mind is exercised, as the philosopher of Geneva has very well observed. Premature application enervates both. We have frequently seen in early age, prodigies of memory, and even of erudition, who were at the age of fifteen or twenty imbecile, and who have continued so through life; we have seen other children, whose early studies have so enfeebled them, that their miserable career has terminated with the most distressing diseases, at a period in which they should have only commenced their studies. "To wish children to be learned," says Fleury, "is to wish a young plant to have, the first or second day, a solid trunk, and profound roots."

Children should never be sent to school before the age of ten or twelve years. The first studies should be directed to those things which are the objects of the senses, and which, by fixing the attention, give rise to ideas, and exercise the memory. Meditation and reasoning belong to more advanced age. The atten-



tion which these operations of the mind require, is a violent state to which it should consequently be prepared by degrees. Drawing, music, geography, arithmetic, natural history, and experimental philosophy, are such as would come within our plan; and should only occupy children of ten or twelve years of age; chronology, ancient and modern history, the languages and literature, should succeed them; and lastly, after having followed the gradation of the ideas and of age, conclude with the abstract sciences, such as mathematics, general grammar, legislation, &c. &c. Such is the plan of studies which appears to me the most conformable to nature, and the most proper to form the truly informed and useful man.

Whatever be the age in which the studies are begun, it is necessary to guard the child from applying himself too long at a time; one or two hours in the day at first, in proportion as the body grows and acquires strength, three, four, or five hours, but at several different periods, is sufficient; the remainder of the day should be consecrated to play, amusement and exercise. It is especially useful to make them avoid weariness in studies, and passion in play. It almost always happens, as Fenelon has very well observed, "that in education all the weariness is put on one side, and all the pleasure on the other." It is, on the contrary, necessary that the exercises of the body and labors of the mind, should serve reciprocally for the recreation and repose, not at fixed hours, but according to the disposition of the body and mind.

Such are, in general, the essential precepts concerning education, the end of which is to form robust bodies, enlightened minds, and virtuous souls; they are

founded on nature, and justified by experience. It is only by faithfully observing them that we can expect a regeneration in the human species, and a new race of men who will be happier than their fathers. But unhappily the torch of philosophy shines only on a small number, and its light scarcely extends beyond the class of those whose reason has been cultivated by studies; the others, for the most part, remain eternally the slaves of prejudice, of error, and of custom.\*

\* See article the first, appendix, vol. ii.

## SECTION IV.

ON MOTION AND REPOSE; SLEEPING AND WAKING.

### CHAPTER I.

#### *On Motion and Repose.*

NOTHING is more conducive to health than exercise. This truth was known to the ancients, and for this reason they made gymnastics the basis of a national education. The first inhabitants of Greece were persuaded that the soul acquires energy in proportion as the body gains vigor. Hence the code of their morals was formed according to the wants of the physical part of man; the first generation furnished athletia, and that which succeeded, produced great men.

The Greeks raised their youth in all sorts of exercises. The Romans, who imitated them in nearly all their institutions, established in the field of Mars, a gymnasia, where the youth came to acquire strength and health. As long as this nation remained ignorant of effeminacy and luxury, it continued healthy, vigorous, and was invincible. It was, according to the relation of Plutarch, the exercises of the field of Mars.

and the fatigues of war, which rendered Julius Cæsar, notwithstanding his feeble and delicate constitution, the most active warrior and the most intrepid hero.

Health is only supported by the free circulation, and the just reparation of the energies, and of the humors. Every thing which obstructs them, deranges the animal economy, and produces aberrations in the functions. Every thing which promotes the regularity and harmony of them, by maintaining a just equilibrium in the principal focuses of the sensibility, establishes health. Consequently, such are the effects which inaction and action produce. The first concentrates the action and the energies in the epigastrium, and debilitates, whereas exercise equally distributes both in all the organs, and produces vigor; this is the reason why Celsus has said, (lib. i.) “Inaction debilitates the body, and labor fortifies it; the first brings on a premature old age, and the second prolongs adolescence.”

Too little exercise throws the organs into inertia. The exterior organ especially suffers from this cause; it loses its activity, the circulation becomes slow, the secretions diminish, particularly that of the perspirable humor. The humors which follow the current of the nervous oscillations, are concentrated in the interior; and embarrassments and obstructions take place in the viscera. The nervous system acquires an extraordinary mobility and sensibility. We ought not then to be much astonished if these obstructions, especially those of the glands, among persons who lead an idle and retired life, and if nervous diseases, hypochondria, hysterics, &c. are the ordinary lot of children of abundance and effeminacy. “He who thinks to pro-



cure himself health, by living in a state of inaction, is as foolish," says Plutarch, with reason, "as he who would condemn himself to silence, to improve his voice."

An idle life not only produces diseases, but it also renders man useless to society, and gives birth to every species of vice. Indolence is the fatal source of a great part of the calamities which afflict the human species.

It is an indubitable fact, as the history of nations prove, that luxury and effeminacy, by enervating the body and corrupting the manners, have produced the decline and downfall of empires. These are the two causes which have produced the revolutions, and caused the degeneration of the human species;\* and it is only by premonishing the future generations

\* Luxury and effeminacy are the spoiled children of opulence, and the authors of indolence and weariness, the parents of all our enemies. The only labor of many men, says an English author,\* is to vary the attitudes of indolence; their nights scarcely differ from their days, except by changing from a bed to a sofa; they live in a peaceable stupidity, they forget and are forgotten. When they pay the tribute due to nature, we should not say of them that they are dead, but that they cease to breath. But laziness is silent and peaceable; it does not excite any envy by its ostentations, nor hatred by its competition. Consequently, no person is engaged in censuring or exhibiting it.

Let us not be surprised then, if this apathy, which is transmitted from age to age, from parents to children, unites to the depravation of the manners, an obvious production of the degeneracy of human nature. We not only meet with fewer old men than formerly, but men are not near so strong nor robust. This degeneration was perceived as long ago as the period in which Seneca lived, and it appears that it has increased since so much, that we are very inferior to the contemporaries of that philosopher. We read in the journal of Chartreuse, of Grenoble, printed in 1689, that the bones of men recently dead, compared with those of persons buried a long time previously in that house, resembled bones of adolescents. A similar observation has been made in respect to the bones of the ancient Bourguignons, dead upon the field of battle at Morat.

\* The author has here probably quoted from memory, a part of an exquisite picture of an idler, drawn by the masterly pencil of Johnson. Vid. Idler, No. 31.—T/.

against our vices, and by establishing in infancy, the foundation of a good constitution, that we can form strong and virtuous citizens, and cause the republic to flourish and prosper. Experience has proved to what degree the power of education may be extended, for the worst constitution may be corrected and even entirely changed by the effect of a hard and austere life, began in infancy.

This kind of life renders the body but little sensible to the impressions of the atmosphere and the vicissitudes of the seasons. Weak and delicate children, who have been accustomed from their first years, to use simple and gross aliments, to exercise in the open air, and to support the extremes of heat and cold, become strong, robust, and capable of resisting the action of the most powerful causes of disease.\* We succeed in renovating the constitution in the same manner that we do in improving the mind. The heart and mind may be improved, and a useful direction given to the passions by wise institutions properly conducted; by this means vicious inclinations of the most powerful nature, have been changed, and the person possessing them inspired with a love of virtue and the laws.

The most salutary exercise is that which is taken in the open air, which brings in action the greatest number of the parts, and which is proportioned to the

\* Plato relates that in his youth, children were raised to hardships, and that they rarely had rheums and catarrhs, but that these diseases became very common as soon as the austere life of the ancient Greeks was relaxed. This philosopher, even thought that the influence of the manners upon the health was such, that one might judge of their corruption in a city by the number of physicians. We also remark that men whose kind of life approaches nearest that of the nations who live in simplicity and innocence, are much less subject to diseases, and arrive at a much greater age than those whose civilization is advanced.

energies of the person. Such as walking in the fields, riding on horseback or in a carriage, swimming, sailing, hunting, dancing, fencing, shuttle cock, tennis, cricket, &c. These exercises and plays, not only promote an equal reparation of the energies in all the organs, and give agility and vigor to the body, but they also recreate the soul, and give rise to agreeable sentiments.

There are physicians who recommend exercise after eating, others say it impedes digestion, and that rest is preferable. "Can we not," says Plutarch, "reconcile these two sentiments, and observe a just medium, abstain from bodily exercise immediately after eating, but supply its place by an amusing conversation, which fixes the attention without fatiguing, and which agreeably occupies the mind?" Such are the entertainments which have been called the dessert of learned men, who roam upon the rich and agreeable subjects of history, poetry, and philosophy, which afford an inexhaustible source of pleasure: this is very wise advice and ought to be observed. To take exercise before rather than after a repast is very salutary, if taken after eating, it should be very moderate; otherwise it may affect the digestion; whereas rest, or what is still better, amusing conversation, and every thing that recreates and relieves the mind, aids and facilitates this function.

Exercise ought not to be violent, nor continued too long. Great fatigue, instead of fortifying, weakens and exhausts the system, it concentrates the energies in the interior, and, by accelerating the progress of desiccation, brings on premature old age.

Exercise should be accommodated to the constitu-

tion and to the seasons. It is indispensable to the pious, to children, and to those whose nervous system is very irritable, particularly in wet seasons. The sanguine, bilious, atrabilious, and old people, have not so much need of it, and ought to exercise less, especially in cold and dry seasons, also in those that are dry and warm.

Walking is the most appropriate exercise for man. Nature has given him two legs, not to have them drawn in carriages, but to make use of, to carry him from place to place. Carriages, litters, and the post-chaise, are only calculated for feeble persons, and for decrepit old people; they may also suit rich persons, and those ambiguous beings, whose whole merit consists in opulence, and who can distinguish themselves in the multitude only by the advantages of their horses, their equipage, and their ridiculous manners. Those who live in cities, would be benefited by a walk in the country every day. The pure air that we breathe in the country, the sweet perfume that the plants and vegetables exhale, when vegetation is in full activity, and the agreeable diversions which the aspect of simple nature procure, diffuse a pleasant sensation in all the organs, and contributes not a little to maintain health. Moreover, by becoming accustomed to the open air, we are inured to the impressions and changes of the weather. Lastly, the organ of sight is strengthened and becomes enabled to discover objects at a great distance in the country. This sense, as well as the others, is improved by use. Experience proves that a want of exercise tends to weaken the eyes. We find many short-sighted people in towns, but scarcely any in the country.



Equitation is an exercise not less salutary than agreeable; it is proper for convalescents, for weak persons, valetudinarians, or chachetic people; it augments the energies, and supports or re-establishes an equilibrium between the epigastrium and the exterior organ; for this reason it has a decidedly good effect in some species of phthisics, and especially in nervous, hysterical, and hypochondriacal affections, in the gout, &c. Sydenham regarded exercise on horseback, as one of the most efficacious means in many diseases. The motion on horseback should be proportioned to the strength of the rider. Very weak persons should go in a walk; they ought to avoid trotting or galloping; these gaits are only useful to those, who possess a sufficient degree of vigor to resist the greater or less commotions which they occasion.

Habitual equitation is not exempt from inconveniences; it gives rise to divers affections, such are, among others, the hemorrhoides or piles; these tumors are the effects of the pressure and concussion to which one is exposed on the saddle. After a long and precipitate chase, inflammations in the anus frequently occur, which often terminate in an abscess of fistula. Hernia is also very common among horsemen; the habitual concussion and pressure render the efforts of the abdominal viscera greater towards the groin than they ought to be, and the rings of the abdominal muscles present, in these cases, a diminished resistance; these openings, though very small, and almost closed by the peritoneum, lose their elasticity by degrees, and permit the viscera, contiguous to them, to escape. The trot contributes not a little to the hernia, and the *curiassier* is much more subject to it than others.

owing to the compression which the cuirass exercises upon the epigastrium, forcing the viscera towards the hypogastric region.

Trotting frequently causes the rider to bounce off and fall upon the saddle, or he is bruised against the pommel, hence he runs the risk of wounding the genital parts, the ordinary consequence of which, is swellings and inflammation.

The continual motion of the horse obliges the trunk to a successive flexion and extension, which is very fatiguing, and which occasions diseases of the kidneys, passing of bloody urine, and sometimes spitting of blood; hence, postillions, couriers, post-riders, are exposed to these diseases. The cuirass, by its weight, occasions a greater flexion, and the effort which the muscles make to extend, being consequently greater, exposes more to the accidents of which I have just spoken. This same cause frequently produces false gastritis, or an inflammation of the muscles, which cover the parts of the epigastrium, under which the stomach and the small lobe of the liver are situated. These hernias may be avoided, by the riders wearing small clothes or pantaloons with very high waistbands, always tight, and which press pretty strong upon the rings. It would also be proper for them to use suspenders, to prevent the motion of trotting from wounding the parts of generation.

Riding in a carriage is a kind of exercise, which is particularly adapted to feeble persons, and to those of an advanced age; but this exercise should not be on a fatiguing route; it ought to be regulated by the strength of the individual, and to cease as soon as he experiences lassitude. It is proper to change the po-

sition frequently, in order that the commotion, which the carriage produces, may not always have the same direction.

Hunting is an amusement not less wholesome than agreeable, provided that it be not carried to excess. Man has a natural inclination for hunting, it is common to him with the animals. The savage knows of nothing but war and hunting; it is an exercise which should succeed, nay, even precede the labors of war. To know how to manage the horse and the arms, are talents common to the huntsman and the warrior. It is an agreeable school to teach an art, which has unhappily become necessary; it produces an entire diversion from business, it affords a relaxation without effeminacy, and gives a lively pleasure without languor, without mixture or satiety. We also experience great advantage from other amusements, such as fencing, tennis, balloon, swinging, swimming, shuttlecock, billiards, bowls, nine-pins; which give pleasure to the mind, at the same time that they exercise the body.

The dance is a very ancient kind of exercise, and is in use among all nations, even the savage; this is not astonishing, for man has a natural inclination to impart the affections and sentiments which he feels, not only by the mean of an articulate language, but also by the gestures and motions of the body. Dancing is the expression of nature, or rather a *dumb poetry*, as Simonides called it. The Greeks were very fond of the dance, and prided themselves on excelling in it; but they, enervated by effeminacy and voluptuousness, soon caused it to become the school of vice and bad morals.

Plato only admitted two kinds of dances, that called

*orchestric*, characterised by tender graces, a modest gesture, well designed body and just steps; another, to which the name of *pelastric* was given, which consisted in lively, rapid, and waving motions; this served to give play and energy to the members. There was still another species among the Greeks, the *cybistic*, which was the act of jumping and tumbling by turns.

The French dance has, independently of the advantages of the other exercises, the property of placing the body well, of lowering the shoulders, and drawing them backwards, which gives more extent and greater play to the breast. Of all exercises, the dance is that which is the most congenial to the female sex; to them it is what riding on horseback is to men; it is the best and most efficacious preservative against the green sickness, and the other diseases of languor, which succeed the age of puberty, and which are ordinarily the effect of an indolent life, to which a vicious education generally subjects young persons.\*

\* However salutary the dance may be, it is not without its attendant evils. In large companies, the air of the room is vitiated by the exhalations and by respiration, and impure air is always pernicious; hence, the necessity of having the apartment large and well ventilated. There are some very serious diseases occasioned by dancing, though not peculiar to it, which particularly affect the fair sex. Tourtelle has proscribed the dance in gestation. It is nearly as pernicious during menstruation, as it is in pregnancy. I have known persons who have lost their lives from dancing during menstruation. Whilst dancing, the general system is much exercised, and becomes preternaturally warm, and as soon as there is a cessation of the exercise, the female flies to the cold air to be refreshed; this sudden and perhaps great transition, powerfully affects the whole system, and causes a suppression of the courses; severe colds are also the consequence, and these frequently terminate in consumption and death. Fainting, &c. which is common in large companies amongst the women, is less so where there is music, than where there is nothing to divert the attention. I was very fully convinced of this truth during the summer of 1809, in attending some public exhibitions. However, this effect should not be attributed to any specific property that music possesses, but rather



## CHAPTER II.

*On Corporeal Labor.*

MAN is not born for idleness; nature in her bounty has destined him to labor; she has rendered it necessary that he should assist his fellow beings, and that they in their turn, assist him. An active life is, besides, the most powerful rampart of virtue, and the ægis of health. Moreover, in order that the animal machine may play well, it should no more remain in a state of rest than the atmosphere, to the vicissitudes of which we are constantly exposed. In order that our lives be durable, we should guard against inaction and effeminacy. It is necessary that a man subject himself by turns to labor and rest, and that he sometimes fatigue himself. To think to enjoy good health, and to live long, by living an uniform life, and keeping always the same seat, when all the beings with which we are in relation, are in continual motion, is absurd and ridiculous. Changes are absolutely necessary to prepare us for those violent commotions, which sometimes shake the foundation of our existence. There are animals, as well as plants, that acquire strength and vigor in the midst of storms, and by the effects of contrary winds.

to the mind being diverted, and not suffered to be engaged with any unpleasant sensation, which the body may experience; and I have no doubt, but that Boerhaave's remedy in epilepsy, would be equally salutary. This opinion is in some degree verified by the effects of sailing; those who are very subject to become sea sick, are less so when greatly alarmed, than when they apprehend no danger.—*Tr.*

Labor is as useful to health, as it is to the happiness of society. Consider the inhabitants of the country, occupied all day with laborious and fatiguing exercises; they do not sing the less in their rustic employments; they enjoy health, whilst the citizens, enervated by effeminacy, yawn in the bosom of pleasures.

“The gout is in town,” says La Fontaine, “and the spiders are in the fields.” Labor, the offspring of want, is the parent of health and of happiness. Let us not then pity country people as we do, for in the midst of fatigue and labor they enjoy the pleasures of health, peace and innocency: there are none truly unhappy but those, who in the lap of abundance, languish in indolence, and effeminacy, which deprives them of the means of enjoying it. However, for labour to support or confirm health, it is necessary that it be proportioned to the state of the strength; for when it is excessive it ruins health and brings on premature old age. These effects are produced by a strong and habitual concentration of the energies in the interior. When the energies are retained, and, as it were, fixed in the epigastrium by excessive labor, the other organs re-establish themselves but incompletely in their natural order of action and re-action. It thence follows, that the exterior organ, deprived of the portion of action which is necessary to counter-balance that of the epigastrium, hardens, and acquires from day to day, the firmness and rigidity which characterizes old age. It is not correct, as some authors assert, that the man who is obliged to give himself up to laborious and excessive exercise, lives longer than the rich man who enjoys exercise, but

does not abuse it. Such an opinion, Raynal justly observes, has been advanced to console the wretched, whom fortune has condemned to drag out their existence under the weight of evils, by persuading them that their state is the most proper to maintain health. This sophism has been invented to complete the destruction of all sensibility in the hearts of the rich, and to prevent their granting favors to the poor. Men, who from their condition, habitually apply themselves to severe and oppressive labor, are very old at sixty, and rarely pass this age; whereas those who use the favors of fortune wisely, frequently attain ninety years or more. There have, however, been examples of men who have been almost all their lives subject to hard and excessive labor, who have, notwithstanding, arrived at a very advanced age. In the *Philosophic Transactions*, there is the history of two persons of this kind, the one of whom died at the age of an hundred and forty-four, and the other at that of an hundred and sixty-five years. But what do such examples prove, except that they are very rare and extraordinary, since it is verified by observation, that five-sixths of these men, subjected to excessive labor, die before the ordinary term.

We may distinguish in general three kinds of labours: 1st. Those which are severe and bring into action the whole body: 2d. Those that a sedentary life requires, and the most of which only exercise some of the members: 3d. Lastly, the labors of the mind. As respects the latter, I will defer speaking of them until I treat of the influence of the mind upon the body. Severe labors require a considerable degree of strength, and can only be performed by

strong and robust men; they are even necessary to support a free circulation of the actions throughout the system: but as I have said above, they ought never to be excessive, nor too long continued; this is the principal rule which should be followed to preserve health.

Those whose state in life subjects them to severe labor in the open air, as husbandmen, are exposed to all its vicissitudes, to the sudden changes from heat to cold, and consequently, to all the affections depending on the influence of the seasons, and the extreme changes of temperature, such as inflammatory diseases, catarrhs, rheumatisms, bilious fevers, dysenteries, intermittent fevers, &c. These causes are inevitable, and there is but one mode of avoiding the diseases which they occasion. We can only weaken the action of these causes, by a regimen analogous to the temperament, season, and that of the atmosphere.

Men whose occupations oblige them to carry heavy burdens as porters, and all those whose labors require long inspirations, and a continued tension of the diaphragm, are exposed to hæmoptysis, occasioned by the rupture of the vessels of the lungs, to inflammations of the breast and abdomen, to hernias, &c. We can only recommend to these laborers not to abuse their strength. There are those who from laziness, or for wagers, carry at one time heavy burdens, which they ought only to carry at two or three times, and who thus expose themselves to the greatest dangers.

In general, those whose labor requires a great expenditure of strength, such as those of whom I have just spoken, also blacksmiths, carpenters, cartwrights,



&c. ought never to work long at a time, but to rest, to enable the organs to acquire the degree of action of which the labor has deprived them.

The sedentary labors in which some men are employed, such as weavers, tailors, &c. are not less prejudicial to health, than contrary to the views of nature.\* The most of sedentary laborers are habituated to their labors from infancy, which is the reason they never acquire a sufficient degree of strength and vigor to make soldiers or husbandmen. It is remarked that they have more address and strength in the parts exercised, and a greater degree of delicacy and feebleness in those that are passive than other persons. These men have a very feeble appearance, they are frequently bow legged, the shape is badly proportioned, and they exhibit in their countenances the kind of labor which they follow. They are frequently sick, and generally become old men at an early age.

Sedentary labors should only be the employment of women, but by reversing the order of nature, these are occupied in the fields in the most laborious work. Women support sedentary occupations, to which they appear to be especially destined, better than men. They are more susceptible of agreeable sensations, and have generally, a greater fund of gaiety. They talk more, and their continual prattling is a kind of exercise proportioned to their condition. They require less aliment, and do not exhaust themselves by profound re-

\* "Never did a boy," says J. J. Rousseau, "aspire to be a tailor. Art must be used to induce a man to pursue this exercise, which is that of women. The sword and the needle are not well used by the same hand. If I were a sovereign, I would only permit sewing, and work which is done with a needle, to the management of women, and to lame and infirm men who are obliged to live like them."—*Emile*.

flections. Besides, they are attentive to a thousand little events in society, which are sufficient to excite their passions, and to raise them to a point necessary to support the circulation of the energies.\* If we find men who grow old in inaction, exempt from the infirmities which are the consequence of it, it is because they possess the advantages of which I have just spoken, and which are proper to women.

It would be useful to the health of those who are subject to sedentary labors, if they would combine them with active ones, or with exercises which set in action all the members, for nothing is more pernicious than a sedentary life. In addition to a sedentary habit rendering those spare, who give up to it, it is also opposed to the free circulation of the energies which,

\* Many centuries elapsed before any one ventured to blush at the labor of his hands, and to derive from idleness a title of nobility and greatness. The women, especially, did not languish in a stupid inaction, they did not pass their lives as those of the present age do, in gauding, in slandering circles which are very improperly called good society, and in paying and receiving visits of ceremony. Hence, they neither knew weariness, vapors, nor other affections which are the fashion of our day, and without which a fine woman would cease to be amiable. After having attended to the domestic cares, the principal occupation of the women, even of queens and princesses was to spin wool and to weave. Such was the employ of Helen, Penelope, Calypso, Circe, and many others of whom Homer has spoken. Solomon's strong woman manufactured flax and worsted, and gave two dresses to her domestics. Similar accounts are found in all the ancient authors, and especially in Theocritus, Terence, Virgil, and Ovid. Nothing is more beautiful than the picture which the latter gives of Lucrecia, working with all her slaves on a *lucerne*, a kind of vestment which she made for her husband. These ancient manners long subsisted amongst the Romans, who consecrated them at their marriages by a ceremony which consisted in having a spinning wheel brought before the bride. They even continued to exist in the age of corruption, as Augustus generally wore clothes made by his wife, his sister, and his daughters. All these different labors were done in the houses, and did not require much strength. This is the reason why the ancients did not think they deserved the attention of men, but left them to women, naturally sedentary, more attached to, and better calculated for little things.

retained habitually in the interior, give place to hysteric and melancholic affections.

A cause not less injurious to these laborers, is their being collected in a place too small and not sufficiently ventilated: they should work in small numbers and in large and well aired places. The most of them, such as tailors, cordwainers, &c. are, during their work, forced to have the body bent forward; this position is extremely unfavorable. In addition to this position being singularly injurious to digestion; by keeping the spine continually bent, it contracts a curved form, which injures the action of the lungs and exposes them to very serious diseases. Stahl has remarked that severe and mortal inflammations of the lungs are very frequent among persons who have the body habitually bent forward, as cordwainers, tailors, &c. This attitude continued, keeps all the muscular system in a state of relative weakness, impedes the distribution of the humors in the viscera of the abdomen, and determines them towards the breast, which is, from this cause, in a permanent state of plethory and congestion. The opening of the dead shows that the lungs are generally more or less affected among those whose trade obliges them to remain constantly in so unnatural a state.

These workmen ought then, to frequently change their situation, and instead of frequenting taverns, houses where coffee is drank, and places of gambling, as the most of them generally do, in their leisure moments, they should take walks and exercise in the open air; they should use strengthening aliments, meat and bread well cooked, good wine moderately, and plants which give action to the solids and fluids; they should

abstain from substances difficult of digestion, from strong liquors, and, generally, from every species of debauchery.

There are labors which expose those engaged in them to the action of fires; others, to that of deleterious miasms; several to that of water, and lastly, others to some of those principles united. Particular precautions are necessary to preserve such persons from the diseases owing to these causes.

Chemists, distillers, founders, glass manufacturers, &c. always experience the effect of heat and of noxious exhalations; from which frequently result, rheumatisms, serious affections of the lungs, and principally cough, asthma, and consumption.

The most efficacious means to prevent these affections consists: 1. In the construction of the laboratories and work shops, these should be so constructed as to permit the free circulation of fresh air in them, and so as to give a quick outlet to the smoke and exhalations; 2. The workmen should not continue too long at a time at their work; 3. They should cool themselves gradually, and put on their clothes previous to going into the open air, when the system has been much heated.

Bakers are subject to the same diseases. Besides, by being up late at night, they are continually exposed to the heat of the oven, and when thus heated, if they go to breathe the cold air, they contract colds and other impressions of the breast. They also inhale the flour, which finally produces dyspnea, asthma, &c. They should avoid sudden transitions from heat to cold, and they ought to cover their heads with a cloth, to prevent the impression of the meal diffused



in the air upon the lungs. They are also very subject to diseases of the eyelids. They ought to wash frequently in cold water. Millers are exposed to these inconveniences, and should take the same precautions.

Miners, and all those that work under ground, are exposed to the accidents which the non-respirable gases occasion. There are three species of gas which they have to fear: which are called inflammable air, heavy inflammable air, and carbonic acid gas.

The first species or hydrogen gas, escapes from subterraneous places, and circulates in a strata form order. When it comes in contact with the miners' lamps, it burns with violent explosions. To prevent this accident, a workman descends in the mine covered with a wet cloth, and armed with a long rod, at the end of which there is a light; he lays down with his belly on the ground, and sets fire to the vapor. As soon as the inflammation has ceased, the workmen may descend into the mine without danger.

When the workmen perceive the second species, which is suspended in the air, their only resource is a speedy flight, for if it alights on them, they are instantly suffocated.

The third species is a thick vapor, which especially forms in summer, and which is disengaged when one opens deep wells, rich mineral mines, and those that have been long closed. This vapor is fatal, and immediately kills those who respire it.\* It has no sensible effect on the mercury of the barometer, nor of the thermometer. The miners are informed of its presence, when their lights grow dull, taught by ex-

\* *Memoirs Philos. Hist. Phys. par Don Ulloa, tom i. p. 343, 344.*

perience, they escape as soon as possible, to avoid its deadly effects. This vapor causes asphyxia, and the least evil that it occasions is a convulsive cough, which ordinarily terminates in a consumption of the lungs. "Those who have been where this vapor existed in a supportable degree, experienced," says Don Ulloa, "a considerable tingling throughout the body, and especially in the extremities, face, and head; a deafness, ringing in the ears, a swelling of the eyes, which seemed to force them from their orbits; in a word, the same effects that are remarked in an animal subjected to a vacuum, or plunged in the non-respirable gases.

In order to prevent the accidents of the carbonic acid gas, it is prudent, previous to the miners descending into the mine, to introduce a lighted torch into it, by means of a cord; if this burns with a vivid flame, as in the common atmosphere, there is nothing to fear; but if it diminishes and becomes extinguished, it is a certain indication, that the air is not respirable; it should in this case be corrected by fires and ventilation.

Miners are also exposed to serious affections, which depend upon metallic vapors, such as paralysses, vertigo, tremor, cholic, &c. to the affections which a privation of light produce; and, lastly, to the diseases occasioned by the concentration of the energies, and the suppression of the transpiration.

In general, the free circulation of atmospheric air, should be promoted in mines, by means of ventilators, galleries, wells, &c. to prevent the misfortunes with which these unfortunate persons who work in them, are constantly menaced. The wells or vents of res-

piration are decidedly the most advantageous; they may with propriety be numerous. Mines differently situated, that is, in mountains, under an inclined plane, or those under a horizontal plane, require ventilators differently constructed. In the former, the column of air in the well differs, in regard to its weight, from that of the mouth of the mine, unless the temperature of the interior air of the well, be the same as that of the exterior. As one advances in exploring a mine, it would doubtless be useful to open new vents; but this would be a considerable labor and too expensive. Mr. Jars has proposed to construct, in the galleries, and to conduct to the bottom of the mine, a ceiling, under which the air would introduce itself, penetrate to the bottom of the mine, and in returning, escape by the wells, the communication of the interior part of the gallery being intercepted from the well by a door.

In the second case, when the mine is dug under a horizontal plane, the columns of air may be rendered equal in weight, by constructing at one of the mouths of the mine, a chimney of thick masonry. When the exterior air is of the same temperature of that of the mine, there may be constructed at the entry or mouth of one of the wells, a furnace, the chimney of which should be very high. The fire of this furnace absorbs the air of the mine, by means of a pipe of communication, and by thus establishing an inequality of weight between the columns of air, procures a free circulation of it.

None but robust men, whose constitutions are fortified by the habit of hard and laborious exercise, should be employed to work in mines. It is such

men as these, who best resist the pernicious impressions of metallic vapors. Hence, De Haen recommended with propriety, that those workmen should only be nourished by strong aliments, and those of difficult digestion, that they should not be permitted to go to work when hungry. In fact, the most powerful means of preserving their health, is to make them live upon substances, which strongly exercise the digestive powers, and which, exciting with their tone the other organs, enable them to resist the deleterious action of the mineral vapors. It is for the same reason, that fermented drinks and strong liquors are particularly proper for those laborers; these are more proper for miners, than other persons who are engaged in hard and fatiguing labors. It is also very salutary for them to wash themselves frequently, and to change their clothes on quitting work.

Men who labor in mercurial mines, and especially in those where the metal is found pure, as well as artists, who employ this metal in their works, are very subject to salivation and tremor. The remedy used in Peru for persons thus affected, who are generally extremely meagre and exhausted, is to send them into warm climates, or to employ them in cultivating the ground, in a manner proportioned to their strength. This exercise or change of residence, excites a free perspiration, which carries off the mercury, with which the system has been impregnated, and soon re-establishes their health.\* However, those who work in mines of mercury, according to the observations of Fallope, rarely live beyond the fortieth year.

\* *Memoires Philos. Hist. Natur. par Don Ulloa, tom. i. p. 349.*



From the observations of Stahl, those who work in lead mines, have a figure peculiar to themselves, and which makes them easily known; their physiognomy is gloomy and has something sinister and threatening in its appearance. These men, as well as those who are employed in the preparations of this metal, such as potters, painters, &c. are subject to paralysis, tremor, and to the saturnine cholic. The gilders in painter's gold, and silver gilt, are exposed to all the accidents, that those are, who work in mercurial mines, because by evaporating the mercury over the fire, amalgamated with gold, they inspire and swallow the vapors of it. The diseases owing to this cause, might be prevented or diminished, by using large work shops, constructed so as to support a free circulation of air. These artists should remain in their shops only when at work, and this should be interrupted from time to time, for the purpose of going to breathe the fresh air. They should also place the forge or furnace opposite a door or window, and fix a large pipe to it, the exterior end of which should be fashioned in the form of a pavilion or tent, and sufficiently large to cover the hearth, and the other end bent and fixed in the funnel of a neighboring chimney, or passed through a window.

Braziers, tinkers, gravers, and generally all those who work upon copper, respire the vapor of it, which produces dyspnea, cough, asthma, &c.; they should use the precautions just specified: they, as well as manufacturers of cannon and smiths, are subject to become deaf, owing to the continual noise which they make, and which destroys the elasticity of the drum of the ear: this affection is irremediable.

Tallow chandlers, those who prepare oils, as well as those who work upon animal substances, such as tanners, curriers, skin-dressers, fish-mongers, cooks, butchers, hucksters, anatomists, &c. are exposed to the fetid and putred miasms which exhale from these substances, and to serious diseases thus produced.

Anatomists are very subject to the scurvy, and to putrid bilious fevers; which the septic miasms that exhale from the subjects which they dissect, occasion. De Haller attributed to this cause, the frequent bilious diseases with which he was afflicted at Gottingen, whilst he demonstrated the parts of the human body in the anatomical theatre of that city. Anatomists have less to fear at present, since the property of oxygenated muriatic acid in destroying the effect of the putred effluvia and preventing its malignant effects, has become known. We cannot too strongly recommend the use of this acid in these cases, as well as in many others of which I shall yet have occasion to speak.

The blood and the humors of the dead, with which the hands of anatomists are continually bathed, sometimes render the slightest excoriations which they make in these parts, fatal. A celebrated English surgeon, who had a slight scratch upon the middle finger of the left hand, poisoned it to such a degree by dissecting a putred womb, as to render it necessary to have it amputated immediately, to save his arm.

All those whose condition in life renders their exposure to deleterious miasms necessary, cannot be too strongly advised to renew the air of their apartments

frequently, and to maintain the greatest degree of cleanliness in them. The welfare of society, and their own interest, renders it desirable that those engaged in these vocations, should perform their labors out of cities; especially in the summer time, in consequence of the putrefaction that is promoted by the heat of this season. They should also make frequent use of vegetable acids, and employ means of purification, especially the oxygenated muriatic acid, to correct every germ of corruption, and to destroy the cause of it.

Sextons are still more exposed than the preceding, to the action of putred effluvia, and to the diseases which it produces. Men whom want has reduced to the sad necessity of living upon the ravages of the dead, rarely grow old. They are almost always pale, their dull eyes, their ghastly and melancholy face announce their bad health, and the profound sense of their misery; for their paleness is not alone the effect of the impression of septic miasms, it is also, in my opinion, that of the influence of the mind upon the body. How can men, whom the disgusting spectacle of the remains of human nature never ceases to sadden the soul, and who perform but with painful feelings, the functions of a state as laborious as melancholy, wear upon their physiognomy the impression of joy and the hue of health? These only bloom in a state of ease and contentment, and not among funerals, bones, carcasses and sepulchral exhalations. Ramazzini says, the blood of sextons is as cadaverous as their figure, and that bleeding should be prescribed in their diseases, but with the greatest circumspection; other evacuants being more proper.

Sextons are also subject to the asphyxia, produced by the non-respirable gases. Many of them have fallen victims to this affection, in opening graves or in descending into the sepulchral vaults. Ramazzini relates, that a sexton having descended during the night in a charnel house, to rob the corpse of a young man, who had been interred with all his clothes, suffocated, and fell dead upon the corpse which he wished to rob. There are many examples of this kind, which prove how dangerous it is to visit the abode of the dead. But these dangers are, at present, much diminished in France, since the burying in churches is proscribed, and the dead no longer possess the right of infecting the living.

We can only recommend sextons to observe the greatest cleanliness in their own persons; and to frequently inhale, when fulfilling the duties of their station, odoriferous waters, vinegar, &c.; to change their clothes and linen, immediately on returning to their dwellings; to open graves, and to descend into vaults with great precaution, and after having satisfied themselves that they having nothing to fear from noxious airs. As to the asphyxia, occasioned by the deleterious effluvia, we refer to the advice given when speaking of atmospheric air.

The workmen who clean sewers, wells, sinks, and especially those who clean privies, are subject to the diseases common among sextons, they respire during their labors, which sometimes continue long, many miasms; that convey into their blood the germ of corruption and death. They are subject to a kind of asphyxia, and to diseases of the eyes, which are peculiar to them.



The asphyxia which attacks cleaners of privies, is called saturnine, or of lead, and is occasioned by the vapors that arise from the privies, when the workmen break a kind of crust which forms at the surface of the excrements. These vapors are very septic, and rapidly produce putrefaction in the system that receives them; they are lighter than air, and slightly inflammable, and are not absorbed by water.

“The symptoms of saturnine asphyxia, are the same as those of the other species of this disease, but when those who are affected with it, give signs of life, their bellies tumefy prodigiously, and the mouth becomes filled with bloody froth; respiration and speech returns slowly, and by degrees, after vomiting and diarrhea. Those who have this asphyxia in but a slight degree, only experience a dyspnea, which is not dissipated until after great and convulsive like efforts.

“Those who are attacked with this asphyxia, exhale morbid putred miasms, which occasion a very serious nervous septic disease, amongst those to whom it is communicated by contagion. The bodies of these diffuse a horrible stench, and are struck with spasms and convulsive motions, which frequently approach to a tetanus or epilepsy, and which continues until a spontaneous vomiting of black fetid matter takes place. To those symptoms succeed pains that remain for many days, and which do not diminish in violence until an eruption of hard, red, and very itchy spots break out. When this eruption disappears suddenly, a violent convulsive cough, similar to the whooping cough, takes place, with acute pains of the stomach, and of the extremities of the ribs at their articulation

with the spine. Sinapisms alone have procured relief in these cases; emolients, narcotics, sudorifics, and acids taken inwardly have not produced any effect; and amoniacs have appeared injurious. The celebrated Halle, relates the case of a man who was attacked with this species of asphyxia, and who had immediately afterwards an obstinate angina, with an eruption of red spots, not so elevated nor so hard, as those that occurred during the disease, but which continued for several months.

“There is another affection that depends upon the same cause, and which is familiar to the cleaners of privies, which is a species of ophthalmia. It is a particular inflammation of the eyes which is frequently followed by blindness. Three species of it are distinguished, the humid, the dry, and the slow fatty. The first is characterised by a tumor, redness of the eyes, and an aqueous discharge which soon cures the disease.

“The fatty or the dry ophthalmia, present the same symptoms as the preceding, with this difference, that there is no discharge, and the swelling and redness is much more considerable; the pain is augmented by external heat, by wine, and a heating regimen. The patient should expose himself to the cool air, use cold lotions and fomentations, refrigerating drinks, and a cooling regimen. This species of ophthalmia may be rendered humid, and the cure promoted by means of sternutatories used in the commencement of disease.

“The dry slow ophthalmia, begins the night succeeding the labor of the workmen, by a pain in the forehead, which these workmen call *fronton*, and which awakens the patient; the inflammation of the

eyes soon appears, and is not accompanied with any kind of discharge. These ophthalmias are frequent, and all privies give rise to them; it is not the same with the saturnine asphyxia, which appears to only be communicated by privies in which animal substances putrefy. It has also been observed, that those are less subject than other persons to diseases of the skin. But their life is not more than half as long, and should they have the misfortune to be infected with the venereal virus, and do not immediately abandon their labors, the disease is aggravated to such a degree, in the course of fifteen days, as to become entirely incurable.”\*

The most proper means to preserve the unhappy workmen from the serious evils peculiar to their calling, are to support a free circulation of air in the wells in which they work, not to descend until they have ascertained by means of lights, that they have nothing to fear from noxious gases; to break the crust formed at the surface of the excrements with precaution, and at such a distance that the vapor exhaled cannot reach them; to strip themselves as soon as they return from these places and to wash all over, especially the eyes, with cool water and vinegar.

The fullers work half naked in stagnant and stinking urine, whence it results that the fetid vapors which exhale from it, and the oily filth of the cloth and woollens which they full, communicate their impression to the lungs and skin; this is the reason why these workmen are subject to diseases of the head, breast, and stomach, to swellings and to oedema of the inferior extremities.

\* *Elemens de medecine theorique et pratique*, par le citoyen Tourtelle, publies en l'an 7, tom. iii. nosologie, classe iv. Espece 21, asphyx. page, 37, 38, 39, et 40.

The precautions to be taken to prevent them from these affections, consist in well airing the places in which they work, to have vinegar and other acids, but especially the oxygenated muriatic, continually evaporated in them; to discontinue their labors from time to time, so as to take the advantage of the open air, as frequently as possible; they are also recommended to wash morning and evening with water and vinegar.

Brewers and wine merchants are exposed to an asphyxia, occasioned by the carbonic acid gas, which is disengaged from beer, and from the must of grapes in a state of fermentation. To prevent this accident, they should frequently open their cellar doors, so as to establish a current of air, which will carry off the vapors of the fermentable substances.

Liquors which have already fermented, also exhale vapors which are very pernicious, and sometimes when respired, there is danger of their producing intoxication; it is especially the vapor of new wine, which is the most to be feared. This affection is easily remedied by taking the air, and by making use of weak coffee or other diaphoretics.

Dyers respire in their works, the strong vapors that are exhaled from the different substances which they employ. These workmen should avoid having the nose and mouth over these vapors, and should also take the advantage of the open air, as often as possible. They are also exposed to saturnine cholics, when they make use of the preparations of lead.

Starch makers knead the meal with the feet, after having macerated it in water, to obtain afterwards its ferculæ, which they dry in the sun. There arises from



this kneaded mass, a vapor of a sourish nature, which by its action upon the organs of respiration, produces coughs and oppressions so violently among the workmen who knead the starch, that they very frequently find themselves obliged to discontinue their work, to keep from being immediately suffocated.

Starch makers are recommended to work in very spacious places, to keep up a current of air in them, and to fix around the neck a kind of pasteboard, or paper cases, or funnels, the largest extremities of which are to be turned towards the head, to break off the direction of the vapors; they might also, from time to time, disengage amoniac, to neutralise the acid vapor, which exhales from the starch. Oils and mucilages are proper in the species of cough and oppression, with which they are suddenly attacked in their work.

Lime burners frequently respire a vapor, which is a mixture of lime, water, and carbonic acid, that is disengaged from the carbonat of lime, which they convert into lime. These kind of workmen are subject to tremor, asthma, and to consumption; they are recommended to take the air from time to time, but not to expose themselves suddenly to the cold air on coming out of their kilns.

Burners of gypsum, and all those who employ daily gypsum, (*selenites*, sulphat of lime,) are not only exposed to the very great heat of the furnaces, but also to the vapor of the gypsum, which is very unhealthy, especially when newly prepared; consequently, the most of these workmen die young with phthisics, asthma, &c.; they ought to take the same precautions as the preceding.

Those who work in marble, statuaries, and stone cutters, respire in their works a fine and impalpable powder, that is detached from the stones and marble, which forms sometimes in the lungs and even in the stomach, stony concretions, that occasion spitting of blood, dyspnea, phthisis pulmonalis. They, as well as statuaries who work upon gypsum, should take the precaution of enveloping the neck with a kind of funnel, as has been recommended to starch makers, to guard the nose and mouth from that dust, which is so pernicious to the lungs, or to cover them, as the bakers do, with a cloth or handkerchief, in order that they may not respire it.

Watermen, fishermen, tanners, washerwomen, live habitually in a cold and moist air, and frequently have the hands, feet, and sometimes all the body in water; this is the reason why they are very subject to cutaneous disorders, to the erysipelas, pleurisies, catarrhs, and rheumatism.

The precautions which these kind of laborers ought to take, consists in keeping themselves well clothed, and to go in the water only when the case requires it, and then to wear boots or buskins, and to wear a cloak of waxed linen, which covers the neck, shoulders, and all the back, in order that they may not be continually wet; they should lay off this vestment at the end of their labor, change their linen, and dry themselves in bed or near the fire; wine and strong drink are particularly proper for them, especially when they are seized with cold.

Bath keepers are forced by their vocation to be frequently shut up in places, which are warm, humid, and surcharged with noxious vapors; this is the rea-

son why they are sometimes seen attacked with asphyxia. When this accident takes place, they should be immediately exposed to the open air, washed with cold water, rubbed with ice or snow until it is melted, and when these means are insufficient, they should have recourse to the others, which I have mentioned when speaking of the air. In order to prevent that fatal affection, bath keepers ought to take care to come out of the bath house, as soon as they experience any oppression, and not to expose themselves suddenly to the cold air.

These same persons, as well as seamstresses, singers, players upon wind instruments, writers, &c. who are subject to a hæmoptosis, owing to the rupture of the pulmonary vessels, which have become varicose. The reader may consult, on this subject, the *Elemens de Medecine theorique et pratique*, tom. ii.; *Nosologie*, class 2; *les flux, espece*, 2. We can only preserve ourselves from this fatal disease, by being as little as possible exposed to the action of the causes which produce it.\*

\* The reader will find some general remarks on the subject of correcting noxious air, cleanliness, &c. &c. in article second, appendix, vol. 1.—*T*r.

## CHAPTER III.

*On Sleeping and Waking.*

WAKING consists in the free exercise of the senses and motions. In this state, the brain possesses its activity; it receives the impressions which each sense transmits to it, and preserves or prolongs them. It is to the faculty which it possesses of retaining the sensations, to which we are indebted for that of comparing them, and of forming judgments. The epigastric organs also concur powerfully in preserving this state, and especially the diaphragm, stomach, and the great curvature of the colon.

Sleep is the cessation of the senses and of the voluntary motions; it is one of the great blessings of nature; it procures us, in some measure, the happiness of being born anew each day, and of enjoying, as it were, a new life. Without sleep, how few charms would life have, as the sensibility would be rapidly destroyed. "Take from men," says a philosopher of this century, "sleep and hope, and he will be the most unhappy being."

The mechanical philosophers have attributed sleep to the exhaustion of the animal spirits; but what proves this cause to be purely imaginary, is, that the greater part of persons debilitated by acute or chronic diseases, remain ordinarily in a sleepless state, until they have recovered strength; also violent exercise or work keeps off sleep, and gives rise to painful and obstinate vigilancy, as well as long continued



profound meditations. These consume, as the *Bellinists* pretend, the nervous fluid, at least, a hypothetical cause, and attract the fluids to the head; they should then produce sleep, which, however, never happens. It thence appears, that it is even the excess of weakness, and the too great tension of the diaphragm, which prevents it; this is, doubtless, the reason why old people whose energies are nearly consumed, sleep less, whilst infants whose sensibility is new, and whose energies only begin to develop themselves, require so easily a sound sleep.

What has given rise to an error respecting sleep, is, that it has been supposed that the continued exercises and labor of the mind exhaust the energies, but this is not the case; they are most frequently accumulated in the epigastric centre, and sleep only causes them to be distributed in the other organs, which were deprived of them; this is the reason why we find ourselves relieved and refreshed after a tranquil and pleasant sleep. But when we give ourselves up to long and profound meditations, to violent passions, &c. the diaphragm retains the action, which it has received from the other organs; it becomes fixed and concentrated in this organ, and the energies do not so soon regain their free circulation; each part is deprived of a portion of that which it possesses in a natural state, and one is then in a state of lassitude, which prevents sleep.

Sleep depends in a great measure upon the moderate tension of the diaphragm; but when this organ is too much irritated, or when the epigastric viscera retains too great a degree of action, the brain, the activity of which is closely connected with the excite-

ment of the diaphragm, preserves the tension, which constitutes the state of watching, and one cannot sleep; consequently, every thing which determines a certain portion of the energies towards the centre, and which occasions a moderate tension of the diaphragm, produces natural sleep. The compression of the brain and its alteration only produces a comatose sleep, of which apoplexy is the last term.

The propensity which all animals experience to sleep after eating, depends then, upon the energies being determined towards the epigastrium, for the labor of digestion exercising less in the other parts of the system. If it were owing, as the mechanics pretend, to the compression of the aorta situated behind the stomach, mortal apoplexies or fatal hæmoptosis would almost always follow; but it is proved that one has nothing to fear from this compression in a natural state, for the stomach ascends and advances towards the *linea alba*, in proportion as it becomes filled, and leaves behind about its little curvature, a larger space, than when in an empty state.

Cold produces sleep, and a person who sleeps in the open air, when the thermometer is eight or nine degrees below the term of congelation, generally dies there, whereas he who is in action, may support with impunity a cold of seventy degrees. Cold causes death, by concentrating entirely the energies in the epigastrium, to the detriment of the other parts of the system, and by converting the action into a violent spasm, which destroys it. Spallanzani produced, by means of cold, an artificial sleep in frogs, which he covered with snow and ice, and which took place among those whose vessels he exhausted, as among

others in which all their blood was left. We know that these animals can live some hours even after the circulation has ceased. These experiments clearly demonstrate that cold does not occasion sleep by giving place to a compression of the brain.

The action of the brain is singularly diminished during a profound sleep; nothing remains in it but what is necessary to life, and it is entirely insensible to external impressions. It is only in light sleep, and when the brain preserves a certain degree of action, that we have dreams. It then retraces, generally in a confused manner, the sensations which it receives whilst awake; hence they are vague and without order, agreeable or disagreeable, according as the motions of the diaphragm are exercised freely or with difficulty. The irritations which the interior organs experience, and which concentrate in the brain, determine in this organ also sensations of pain or pleasure, analogous to the desires and anxieties that we experience when awake, and also frequently, to the nature of the functions of the organ which communicates its irritation to the brain. It is thus for example, that the irritation of the parts of generation, sent sympathetically to the brain during sleep, give rise to sweet illusions and to pleasures, which although imaginary, are not the less felt.

Observe the young man in whom life superabounds, and whose ardent imagination has on the preceding evening, hurried from beauty to beauty. He sleeps in the arms of love and in the bosom of voluptuousness, he thinks he is giving tender kisses to her who has most powerfully excited his amorous desires; his members experience the agitation of pleasure: and the

cup is exhausted as though he had really enjoyed her. The impressions are real, and he cannot be mistaken in them when he awakes. It is thus that the silence of the night recalls to the imagination the objects which most powerfully affected it while awake. The huntsman thinks he is wandering in the forests in the the pursuit of game, the judge dreams of law suits; the coachman of his equipage, &c.

What'er in day the mind intensely views,  
In sleep the lively fancy oft renews;  
The wearied huntsman though he seeks his bed,  
Still to the fields and chase is onward led,  
To lawyers suits, to soldiers arms are dear, &c.

Or thus Homer says,

"In sleep when fancy is let loose to play,  
Our dreams repeat the wishes of the day."—POPE.

When sleep is the effect of natural causes, and its duration is proportionate to what the system requires, it restores the body and renders it more agile and active.

This condition suspends the exercise of the external senses, and of the voluntary motions. The pulse is slower, the respiration is not so frequent, the peristaltic motion of the stomach and intestines is more feeble; the course of the blood and humors slower, the secretions and excretions are diminished, and especially the transpiration. The energies which are retained in the epigastrium, are insensibly distributed to each part of the system in a suitable proportion, the nerves and the muscles resume their activity, and sleep terminates.

When sleep is carried to excess, or produced by vicious causes, it debilitates the system, and renders



it sluggish, it diminishes the activity of the senses and the powers of life. The sensibility becomes more and more blunted, and the system falls into a state of relaxation.

It becomes effeminate, corpulent, and less calculated to perform its functions. Excessive sleep is equally injurious to the operations of the mind, and especially to memory, because it relaxes and weakens the fibres of the brain, and destroys their elasticity.

1. Sleep, to be salutary, ought not to exceed certain limits; it should not be continued more than six hours for a well constituted adult, who leads a regular life, never more than eight or nine at most.

2. The chamber in which one sleeps should be retired and remote from every kind of noise. The less the body is exposed to the action of external impressions, the more refreshing is the sleep. It is a bad practice to preserve lights during night, in a chamber.

3. The apartment in which we sleep should be large and well aired. Fresh air should be frequently introduced into it, and the windows of it should be always kept open, except when we go to bed.

4. We should not experience any uneasiness in the bed, and the body ought to be in nearly a horizontal position, except the head, which should be a little raised. It is injurious to sleep half sitting, in such a manner, that the body makes an angle with the inferior extremities. This situation renders the circulation of the blood and fluids, in the abdominal system difficult, and produces deformity in infancy and in youth.

It appears, from the form and situation of the sto-

mach, that the position most favorable to digestion, especially when one sleeps soon after eating, is upon the right side. In the contrary position, the aliments have an inclination which renders their passage in the intestines difficult, and they necessarily impede by their volume, the alternate motions of the diaphragm, and by communication, those of the heart. When one sleeps upon the back, the night mare, or nocturnal pollutions is pretty frequently the consequence. The position of persons who sleep upon the right side, does not expose them to the same inconveniences; they have nothing to fear from the precipitate descent of the aliments into the duodenum, as the inferior part of the stomach is obliquely curved from before, backwards towards the superior orifice. but a little lower; and besides, the stomach, according to the observation of Galen, experiences during digestion, an anti-paristaltic motion, that retains the aliment in the stomach, and which only diminishes in proportion to the operation of digestion, until this being concluded, it gives way to the peristaltic motion. It is only when the digestion is badly performed, that we naturally change our position every moment, that we sometimes lie upon our right, sometimes upon the left side, then upon the back or belly. Nature, restless in this circumstance, aids herself by this changing of position.

5. The habit of studying or reading in bed, before going to sleep is improper; by this means we too strongly affect the diaphragm, and the brain is powerfully excited by it; thence it happens that we cannot sleep, or that the sleep which we have, is agitated by dreams, to which an imagination recently occupied necessarily gives rise.

To continue awake too long is not less prejudicial to health than sleep carried to excess. It deranges the order of the functions, produces too long continued efforts in the organs which require rest, and puts them in a kind of injurious tension. The organs situated in the epigastric region, are especially those which experience a habitual spasm. In a word, vigilance abridges life, and fills it with diseases. Sleep is indispensable, and still more so after the labor of the mind, than after that of the body. It was no doubt, from its well known necessity, that the *Tresenians* sacrificed upon the same altar to sleep and to the muses.\*

The question whether digestion is better performed when asleep than awake, and whether it is more salubrious to sleep or continue awake after eating, has been frequently discussed. To solve this problem, it is at first necessary, to take into consideration the habits of the person and the climate in which he lives. In general, the habit of sleeping after eating, is, other circumstances similar, less dangerous for persons who take habitually violent exercise, or who are daily accustomed to hard and laborious work, and who sleep little in the night; such as countrymen, vine dressers, &c. than for those who are not thus engaged. The inhabitants of warm climates are also in the habit of sleeping after dinner. Far from blaming this custom, I think, on the contrary, that it is very salutary, in consequence of the excessive heat of the mid-day, which diverts the energies necessary to digestion from the stomach. But it ought not to be the same in cold and temperate climates, at least

\* Pausanias, lib. ii. corinthi.

among the greater part of the inhabitants of these countries.

It is necessary to distinguish two classes of persons. The one have nerves so delicate, that the least excitement is sufficient to derange the order of the motions, and to render them irregular, or as Bordeu has very well observed, "they have contracted such a habit of meditation, that they continually exhaust themselves by reflection. Others have nerves whose action is strong and constant, and the concord and harmony of whose motions nothing can trouble.

From a view of this nature, we may be sure that children, women of a delicate constitution, the greater number of studious men, and generally, all those whose nervous system has too great a degree of sensibility, should sleep to digest well. During sleep, nature has more command over herself; she usefully employs a portion of the energies necessary for the labor of digestion; on the contrary, by continuing awake, the action of the nerves, which is slower and more difficult, may be excited by irritating causes, which are almost continually renewed while in this state.

In warm countries, the mid-day nap is useful, not only to enable one to avoid the excessive heat of the mid day, but also because sleeping restores to the epigastric region a part of the energies necessary to digestion, which the heat causes to diverge to the exterior organ.

Sleep fattens certain animals, which digest during this state. We must not, however, thence conclude, that sleep is absolutely necessary to the digestion of aliments, for corpulency is not always a certain sign



that this function is performed in a proper manner.

There are many very corpulent persons who digest with difficulty and with pain. Nature has destined the night for sleep; nothing is more contrary to the order of the regulations which she has established, and consequently to health, than that of continuing awake late at night.

It is particularly on the animal economy that the diurnal motion of the earth impresses its influence in a very sensible manner. We observe in every person, principally in those whose nervous system is very sensible, changes which correspond with the four cardinal points; but the most remarkable, is that which takes place about evening, and which consists in a light fever, characterised by the increased frequency of the pulse, lassitude, and a propensity to sleep, which insensibly augments towards midnight. This fever is useful, inasmuch as it tends to perform the depuration of the humors, and to elaborate completely the secretory substances. Hence it terminates in a manner truly critical, by the abundant excretions, and especially by that of the perspirable humor. It thence results, that he who, instead of enjoying the nocturnal repose, continues awake during the febrile paroxysm, destined to separate and to purify the humors, disturbs and disconcerts the provision of the motions which are intended to perform such salutary effects, and prepares for himself a multitude of inevitable diseases.

The vapors of the substances burnt to give light, also augment the danger of continuing awake, by contaminating the air, and they render it equally in-

jurious to the eyes, nerves, and lungs. It was to the excessive labor of the night, that the poet Milton owed the loss of his sight.

In fact, night watching, quickly ruins the most robust temperaments, as is proved by the debility into which those soon fall, who according to the common expression, *turn day into night, and night into day*; their pale and wan visages, and the serious affections to which they are soon subjected, shew that we cannot deviate from nature, nor infringe her laws with impunity. The air, cooler and moister in the night than during the day, the silence and the example of almost all living beings, indicate to man the time that he ought to dedicate to repose. At this period sleep is much more tranquil, more profound, and repairs much better exhausted nature, than it does during the day; every thing is quiet, and the organs of sense are not exposed to so many irritating causes, which are obstacles to sleep, and prevent its being tranquil and restorative.

It is not possible to prescribe to each individual, in a fixed and precise manner, the length of time that he should dedicate to sleep. There are a multitude of circumstances which influence the necessity of sleeping a longer or a shorter time.

Children, young people, and women, ought to sleep more than men of a middle age and the aged. The pituitous ought not to sleep so much as the bilious, atrabilious, and those who are corpulent; these ought to sleep less than those who are meagre and of a dry constitution. We sleep more in winter, which is the season of rest, and in the beginning of spring, than

we do during summer, and the commencement of autumn. It is in general, proper to take less exercise, and to sleep more during warm weather, than in that which is warm and wet; for as *old De Cos* says, "sleep moistens and relaxes the body, and night watching dries it."





## SECTION V.

ON WHAT OUGHT TO EXCRETED, AND WHAT SHOULD  
BE RETAINED.

**M**AN enjoys health when each organ performs the functions that it has to fulfil, in a manner suitable to his age, sex, and temperament. The secretions and excretions are functions of the greatest importance to the support of health; their disarrangement announces a greater or less disorder in the motions and actions; and among the principal seats of the sensibility, a defect of harmony, which gives rise to disease.

The order of the secretions and excretions depends principally upon the general action of the system; and it is a truth generally received, that the humors are obedient to the determinations of the motions of the organs, and that, consequently, these same humors ought always to flow towards the regions of the system, in which the action is the most powerfully determined. We also see, on attentively examining the motions, which are performed in most of the secretory organs, that these motions depend upon the general and progressive circulation of the energies, which are successfully diffused throughout the system; this is

the reason why the greater part of the secretions and excretions that are performed interiorly, are executed during the first stage of digestion, that is to say, when the energies converge towards the stomach; and when this labor is advanced, they are diverted towards the intestinal canal, and successively in every part of the system.

The secretions and excretions depend upon the sensibility, and are under its dominion. The organs which perform these functions, possess a specific sense, by virtue of which they only admit, in a natural state, substances analagous to their taste and appetite, and refuse every thing which is disagreeable to them. But when a want of harmony prevails in the general action, when the sense of these organs is vitiated or destroyed, then they fulfil their functions badly, or do not perform them at all, and the substances which ought to be secreted or excreted, being retained, alters the mass of blood and humors, depraves the action more and more, and perverts entirely the order of the motions. Sometimes they are deposited in one part, irritate it, produce sympathetic affections in the other organs, and thus give place to different diseases.

Excessive excretions are the effect of a morbidly augmented determination of the energies towards the excretory organs, and most frequently owing to a morbid matter; but they become themselves almost always the causes of diseases, how short a time soever their action may continue. It is necessary then, to maintain health, that the secretions and excretions be freely performed, and that they be circumscribed within proper bounds. The same as the chyle is extract-

ed from the aliments, thus the blood is formed by the chyle. The blood is a recremental humor, and the reservoir of all the animal substances, of all the fluids and solids. It is truly a circulating flesh, to make use of the happy expression of Bordeu; the gelatin, albumen, and gluten, or the fibre, are contained in it in a dissolved state.

The blood is a red fluid, ordinarily at the thirty-second degree of the temperature of the thermometer of Reaumur, in man, quadrupeds and birds. Its temperature among what are called *cold blooded* animals, oviparous quadrupeds, serpents, and fish, is the same as that of the medium in which they live. Its taste is sweetish, and a little salt. It is concressible by cold, and miscible in water. This fluid separates spontaneously into three distinct substances: the *white serum*, the *red serum*, or *coloring matter*, and the *fibrous substance* or *gluten*. The white serum is coagulable by fire, alcohol, the metallic oxyds, &c. Its coagulation by these substances is owing to the fixation of the oxygen. From two hundred parts of white serum, are obtained forty parts of albumen, four of the muriat of soda, three of the carbonat of soda, two of the phosphat of lime, and an hundred and fifty-one of water. It is more gelatinous than albumenous, in children of the first age; but the proportion of albumen augments as life advances. The white serum of blood does not differ from the serum produced by a visicatory or blister, except that the latter does not contain quite as much albumen, and it has an amber color, which *Margueron*, who analysed them, attributed to the action of the remedy. It does not differ essentially from the *liquor amni*. Citizens *Vauquelin* and *Buniva*

have analysed this fluid, as well as the substances which adheres to the skin of the new born child, and they have found in the first, albumen, soda, muriat of soda, and phosphat of lime. The liquor amnii has a sweetish and spermatic odor; it is saltish, milky, and foams when agitated; it does not coagulate by the action of caloric; it turns the tincture of violets green, and reddens that of tournsoil, which indicates the presence of an alkali, and of an isolated acid; perhaps the latter is volatile, or is reduced during the evaporation of the liquor, to a state of water. The substance which covers the body of the fœtus, is the albumenous substance itself, degenerated, which begins to pass into the state of a fatty body. The liquor amnii of the cow, afforded them a particular animal matter, a new acid, and the sulphat of soda. It thence appears, that this liquor is destined to form a part of the nourishment of the fœtus, and that it is not an excremental humor of the child, as some physiologists have thought.

The red serum is of the same nature, and differs from the white serum only by possessing a certain quantity of the oxyd of iron, and a small quantity of magnesia. The gluten is naturally in a concrete form, and is soluble in the alkalies. The blood is the common source of all the secretions and excretions.

It is necessary to distinguish the arterial from the venous blood; their properties are not the same.

1. The arterial blood is of a vermillion or rose color, the venous, on the contrary, is of a darkish color. We must, however, except that of the pulmonary veins, which resembles that of the arteries, and the



blood of the pulmonary artery, which is similar to that of the veins of the other parts of the system. I have explained the reason of this difference of color.

2. The venous blood is less coagulable and more watery than the arterial.

3. The temperature of the venous blood is inferior to that of the arterial. Galen has already remarked, that the blood which comes from the left ventricle, is warmer, than that which is thrown into the lungs by the right ventricle of the heart. From the experiments of Crawford, it results that the temperature of the arterial blood is, in sheep, to that of the venous, as an hundred and fifty are to an hundred. In man, this relation is as thirty-two to thirty and some fractions.

4. The venous blood contains more hydrogen and carbon than the arterial; its motion is also slower.

5. Lastly. The arterial blood differs from the venous in the proportion of their principles. The first contains thirty-two parts of gluten, sixty of serum, and eight of the coloring principle, which is contained in the oxyd of iron, united to an extracto-resinous substance. The venous blood has but twenty parts of gluten, forty of serum, and eight of the coloring matter.

The saliva is a fluid secreted in the mouth by the salivary glands, and which is extremely useful to digestion, as I have said in speaking of the digestion of aliments. Subjected to a chemical analysis, it gives gelatin, carbonat of amonia, and phosphat of lime.

The too frequent discharge of the saliva by spitting, is injurious to digestion, and renders this function difficult and laborious; it occasions a dryness

and thirst; the animalization and assimilation is badly performed; the aliments badly digested, do not repair the energies; thence cachochymia, cachexia, &c.

The nasal mucous, and that of the bronchia, are composed of gelatin and water, of pure soda, phosphat of lime, and phosphat of soda; it thickens by the contact of air, and by the fixation of oxygen. It appears that the other mucous humors, which line the alimentary canal, bladder, urethra, &c. are of the same nature, as that secreted by the schneiderian membrane, and in the bronchia. These mucous fluids are superabundantly formed in pituitous persons; thence it happens, that they ordinarily blow their nose and spit much. It is even necessary to promote these excretions in such constitutions. Persons of this temperament are recommended to use a dry and tonic regimen, wine, exercise, and to abstain from every thing, which can cause the action of the cellular and lymphatic system to predominate. The pituitous have been recommended to use tobacco, to promote the mucous excretion by the mouth and nose, but its use is not without inconveniences, nor even without danger.

In addition to its attacking the enamel of the teeth, and injuring them, the irritation which tobacco produces when chewed or smoaked, injures the digestion by causing too great evacuation of saliva, a part of which carried to the stomach, causes vomiting and diarrhea, in persons who are not yet use to it. The too frequent excitement which the tobacco occasions in the stomach and intestines, destroys the tone of them; the appetite becomes languishing, the digestive organs lose their activity, and great smokers are subject to

the same diseases as drunkards. Besides, the use of tobacco causes thirst, and obliges us to drink a great deal, and this excess of drink becomes a new source of evil, more or less dangerous, according to the kind of drink which we use.

The narcotic principle which tobacco contains, produces other not less dreadful disorders; it occasions vertigo, insensibility, agonies, sometimes inebriety, lethargy, and apoplexy. It is, therefore, wrong to employ the smoke of tobacco as a means of preventing the apoplexy. De Heyde, Van Helmont, Tulp, &c. have seen this disease produced by this cause. The physicians of Breslaw speak of two Sicilian brothers who, after a wager who should smoke the longest at a time, died apoplectic. We read in the *Memoirs of the Curiosities of Nature*, the case of a man whom the pipe rendered epileptic. De Heyde and Tulp cite cases of very serious affections of the breast occasioned by its use. Van Swieten has seen it give rise to very severe diseases of the liver; Haller, to consumption, &c. I do not pretend, however, to condemn absolutely the pipe; it may in some circumstances, be a useful remedy. The smoke of tobacco conveyed through a long, slender stem, in the manner of the Persians and Turks, to the end of which the bowl, which contains the narcotic principle is fixed, may be useful to persons of a lax and humid constitution; it stimulates the salivary glands and augments their action, as well as that of the stomach and intestines, but it should only be used moderately. It is in this manner, that it has been supposed to dissipate some of the diseases, produced by a superabundance of serum, it has also sometimes diminished considera-

ble salivations, when they were produced by an extreme relaxation of the salivary organs; it has relieved some asthmas, by aiding the expectoration of the viscous humor, which obstructed the bronchia.

It is not more salutary to take snuff. It makes us blow our nose, say some; that is true, but it is a kind of habitual cautery, which it is dangerous to suppress, when one has once contracted the free use of it. Besides, we should not blow our nose incessantly, since nature has established other excretory outlets. The use of snuff taken moderately and rarely, may be salutary to pituitous persons; but if they take it to excess, habit becomes a second nature, it is then necessary, and it ceases to become a remedy. The example of Mithridate proves, that poisons even lose their deleterious quality, when one becomes familiarized with them. The Turks make daily use of opium, and take it in considerable doses. Much smaller quantities of it would destroy those who are not habituated to its use, than they who take it daily.

Another, not less considerable inconvenience from habitual use of snuff, is that it impares and weakens the sense of smell; it finally destroys the tone of the brain, by the continual commotions which it causes it to experience, and by the stupifying quality which it possesses in an eminent degree; "for tobacco," as lord Bacon has very well observed, "is a kind of henbane, which affects the brain as opium." The debility of the other senses, the loss of the memory, and the tardiness of the intellectual functions, have frequently been brought on by its immoderate use; it is especially injurious to dry, nervous, bilious and atrabilious temperaments. It is pernicious to sleep in



magazines of tobacco. Buchoz relates the case of a little girl about five years old, who had a dreadful vomiting, and perished in a very short time from this cause.

The fœces are the residue of digestion; they ought not to remain too long in the intestines, otherwise they harden and cannot afterwards be expelled, but with the greatest difficulty. The compression which they make upon the abdominal viscera, the circulation of which they impede, frequently occasions embarrassment in the system of the vena porta. The habitual spasm which constipation causes in the intestines, irradiates upon the abdominal viscera, the action of which it impedes, and also sometimes upon the superior parts, and there produces heaviness, pain, vertigo, want of sleep, and other affections of this kind.

The frequency of stools, and the promptitude with which they are evacuated, announce a bad digestion, and a considerable debility of the system. A just medium between these two extremes, is the most favorable state to the preservation of health. This state depends much upon regimen, sleep, and exercise.

Those who do not observe any rule, and who give themselves up habitually to the excesses of the table, digest badly. It is not then astonishing, that their bowels are more laxative than proper. Those who take little aliment; as well as those who sleep too much, and who live a sedentary and idle life, have generally constipated bowels, because the energies, incessantly diverging to the skin, or fixed in the bowels, produce in them a kind of spasm, either tonic or atonic, which is opposed to the establishment of the

paristaltic motions necessary for the alvine evacuations.

In a state of health, the excrements ought to have a certain consistence, neither too hard nor too soft; they should be moulded, that is to say, they should have the form of the large intestines in which they have remained some time, Very hard excrements, and voided in small quantities, are ordinarily the effect of excessive labor of the body and mind, and sometimes of the excessive use of wine and strong liquors. Aliments taken in too small a quantity, frequently produce similar stools. Those whose excrements are soft and copious, use a very succulent and very abundant nourishment, or aliments which possess a laxative quality. These indispositions may be easily remedied by changing the manner of living.

It is not possible to say how many stools one ought to have per day, to enjoy good health, because these evacuations necessarily vary by the influence of age, temperament, regimen, exercise, passions, and many other circumstances of life. However, we may say in general, that children of the first age ought to have loose bowels and several stools per day, whereas one or two are sufficient for ordinary adults. Nevertheless, these suffer some exceptions, and the number of persons who go but once to the *necessary* every seven or eight days, is not very rare: but such a constipation is not exempt from dangers; in the end it ordinarily causes diseases.

The most efficacious and the most natural means to procure proper evacuations every day, consist in rising early, and exercising in the open air. The heat of the bed, and the horizontal position that we are con-

fined to while in it, renders the stools irregular. Locke recommended nature to be solicited to this evacuation every morning, whether or not one experiences a disposition to it; and this habit will become with time a second nature: this advice is of the greatest utility. That of frequently recurring to purgatives or glysters, to prevent or remedy constipation is a very bad practice; for, in addition to their not having the desired effect, when the habit of them is once contracted, they also weaken the intestines and disorder the digestion. Those who have naturally constipated bowels, ought to dress thinly, and to avoid the use of heating and astringent substances.

Persons who have soft and thin stools, ought to change their regimen, when this inconvenience is owing to its being too succulent or too copious a nourishment. Tonic, restorative and astringent aliments, the use of good old wine, and even of coffee, is proper in contrary cases, that is to say, when the laxity of the bowels is owing to a debility of the *primæ viæ*, which is also frequently the case. It is necessary to observe that the action, concentrated in the intestines, and which in those degenerates into a spasm, produces according to this affection, either constipation or diarrhea. The first takes place when the spasm is fixed, and the diarrhea when the spasm is light, and when it precipitates the natural peristaltic motions. The laxity of the bowels is most frequently owing to the flowing of the energies from the exterior to the interior. In this case, the proper means to support their expansion should be employed, such as moderate exercise, tepid bath, frictions, &c.; it is also proper to support the heat of the feet, and that of the whole exterior

surface of the body, by means of woollen shirts and socks.

The urine is an excremental fluid, secreted in the kidneys, whence it is carried by means of the ureters into the bladder, from which it is excreted by the urethra. Urine is composed of water, which constitutes more than seven-eighths of it, and which holds in solution the uric acid, (formerly called lithic. This acid is the basis of the calcula of the kidneys and bladder; it is not found in the other animal fluids,) of phosphoric acid, in an uncombined state,\* of a triple salt, called fusible salt of urine, which is a neutral salt, resulting from the union of the phosphoric acid, with the soda and amoniac, phosphat of lime, muriat of soda, muriat of potash, and of two particular substances that color the urine, of which the one called soapy, is saline, crystalizable, deliquescent, and soluble in alcohol; and the other, less deliquescent, is soluble in water and not in alcohol. Both give by distillation animal productions, and easily run into putrefaction.

Chemical analysis have demonstrated in urinary calcula, the uric acid, phosphat of lime, urat of amonia, phosphat of amoniaco-magnesia, oxalat of lime, of silicia, and a greater or less quantity of animal matter.†

\* Citizen Bertholet is said to have observed, that the urine of gouty persons contains naturally less phosphoric acid than that of others; but that it is more charged with it than ordinary during the excess of this disease, although there is frequently less in it than in that of persons not subject to the gout. He conjectures that the phosphoric acid, is not evacuated by the urine by gouty persons as by others; that it separates itself, as it were, and that carried to the articulations, excites in these irritation and gouty pains.

† Foureroy has seen urinary calcula of the nature of silicia. It is very probable that it proceeded from the aliments of the individual, for this earth does not form in organized bodies, and it is found in pretty large quantities in the seed of *cercalia*, as well as lime, magnesia and argile or clay, according to Ruckert, whose experi-



We distinguish two kinds of urine, that of *drink* or *crude urine*, and that of *digestion* or *concoction*. The crude urine, or of drink, is voided soon after a repast; it is clear, has but a feeble taste or smell, and contains much less of the uric principle than concocted urine. It is very probable, that crude urine is formed in a great measure, by the superfluous water drank, and by the vapors diffused in the abdomen, and aspired by the bladder, which, as experience proves, possesses in a very eminent degree the faculty of absorbing; and in fact, this kind of urine is voided too soon, and in too large a quantity to have been secreted in the kidneys. Such is among others, cases which take place, after taking a large quantity of mineral waters or diuretic drinks. We may thence conclude, that the quantity of urine which the kidneys secrete, is but small in comparison to that which is absorbed by the specific action of the bladder.

Urine of digestion is secreted in the kidneys, it is of a citron yellow color, and has a strong odor and saltish taste; it is only secreted when the digestion of the aliments is concluded. However, the color as well as the specific density of concocted urine, varies much in different persons. In a man of a strong and vigorous constitution, its color is very deep, it has

ments are given by Kirwan, we find these earths in the following proportions, in wheat, oats, rye, and potatoes: the wheat contains forty-eight parts of silicia, thirty-seven of lime and magnesia, and fifteen of argile; oats, sixty-eight of silicia, twenty-six lime and magnesia, and six of argile; rye, sixty-three of silicia, twenty-one of lime and magnesia, and sixteen of argile; potatoes, four of silicia, sixty-six of lime and magnesia, and thirty of argile.

The carbonat of lime is not only met with in aliments, but it is also formed by the vital action, as the experiments of Vauquelin prove. He also observed, that a part of the silicia contained in the oats, had been converted into lime, either in the shells of the egg, or in the excrements of the hen.—*Annals de Chimie.* tome 29.

less water and more of the uric principles. In weak persons, women and children, it is more abundant and more watery.

Urine of persons in health is slightly turbid, five or six hours after having been voided, and soon deposits a sediment which raises in a cone, from the centre of the fluid. This deposit, at first in a small quantity, augments until all the urine is rendered turbid by putrefaction. This sediment is white, uniform, and equal, and is a sign of perfect concoction. Chemistry has not yet extended its discoveries to the nature and qualities of the urinary sediments. It is very probable, that that of concocted urine is gelatinous. It is more or less abundant, according as one takes more or less nourishment; which has induced Galen to say: "There is less sediment in the urine when we use a spare diet, a moderate one when we live moderately; but the urine is in a larger and more copious quantity when we live more freely." The sediment of urine is proportioned to the quantity of matter which the body assimilates; hence it is more copious after sickness, during a remission, and when a salutary crisis is about to form.

The evacuation of urine, which is a kind of animal ley, is absolutely necessary for the support of health. When it is retained too long in the bladder, this organ tumefies, and the hypogastria as well as the loins, become painful, the bladder soon loses its energy; at other times it inflames, and a gangrene is the consequence. Urine thus retained in the bladder or in the blood, for the want of the secretion of the kidneys, causes the most serious affections, anxieties, thirst, nausea, vomiting, chills, fevers, delirium, convulsions,

sleepiness, apoplexy, and death. All the excremental humors, as the saliva, sweat, transpiration, &c. have, in these circumstances, a urinous taste and odor.

It is then essential not to retain the urine, but to be obedient to the call of nature, and void it as soon as there is an inclination. Every thing that can retard or suppress the evacuation, is extremely dangerous. To promote the secretion of this fluid, it is proper to take exercise, and not to remain too long in bed, and especially in soft and warm beds.

Urine voided in too large a quantity disposes to disease, and is sometimes the effect of it, as in diabetes; its excessive excretion may be the effect of an immoderate use of watery drinks, of saline, alkaline, or diuretic substances, which excite habitually the action of the kidneys; this indisposition, when even of a short continuance, soon debilitates the system, and produces a general consumption; it may be remedied by abstaining from those things, which gave rise to it, and by using, at the same time, a tonic and astringent regimen.

The perspirable humor is a fluid which exhales from the body, in a state of gas, in a greater or less quantity, according to the different conditions of the system. Transpiration is a function, by means of which nature relieves herself from the volatile excremental humors, which would be injurious to life, for the animal nature possesses the faculty of volatilizing all the constituent principles: *naturam animale[m] omnia volatilisare*, says Van Helmont.\* It is also one of the outlets by

\* De simplicibus digestionibus.

which she effects the *animalization* of the humors, by *decarbonizing* them. In fact, if we examine the stagnant air at the surface of the body, as Jurine has done, we shall see that this air contains carbonic acid, and that it has less oxygen gas than previously, which only takes place because a portion of the latter combines with the carbon, that is disengaged from the surface of the body, and forms the principle of the carbonic acid with it.

We must not confound the cutaneous exhalation, which the vital energies continually determine to the skin, with the perspirable humor. The first takes place at all times, and is more or less charged with nourishing juices in a state of vapor. Transpiration is, on the contrary, a concocted, excremental, and carbonized matter, which results from the perfect digestion of the aliments, and which only takes place at certain periods; it is the most abundant six or seven hours after eating; it is prepared especially during the night, and is rapidly evacuated in the morning.

Perspirable matter also differs from sweat, although these two excretions are made by the same outlets. Sweat is always the result of a violent state; it carries off a large quantity of nutritive particles, enfeebles the system, and renders a person heavier to his own feelings, although he is in fact lighter; whereas transpiration renders him lighter in every sense, and seems to augment the energies.

The skin is not only an exhalent organ, a real sieve, but also thousands of little aspiring absorbing vessels, open at its surface, as I have already said, and absorb these substances, which surround it, containing either the germs of health, or those of des-



truction. It is important then to associate with healthy persons, and the marrying a wife of a good complexion or a bad health, is not a matter of indifference. The miasms which exhale from persons, do not contribute a little to maintain or ruin the health of those who receive them.

Transpiration is more abundant in the day than in the night,\* and when digestion is finished than at other periods; that is to say, when the humors are directed more abundantly towards the circumference of the body, by the determination of the general action towards the exterior organ. The skin then tumefies and becomes red, which clearly proves that it enters into action, or rather that this augments in its turn. A similar operation successfully takes place among the other secretory organs.

It is observed that there is a constant relation between the urine and perspirable fluid, so that when the first is abundant, the latter diminishes; and, reciprocally, this augments in proportion to the diminution of the urine, unless some obstacles prevent this vicissitude.

The affections of the mind have a great influence on the transpiration; this is more or less abundant, according as the affections are agreeable or disagreeable; the first determine the energies from the centre to the circumference, and the second cause the concentric force to predominate. This function is also in-

\* The experiments of Sanctorious prove that the transpiration is more considerable in the day than night. There appears to be an error in his writings, which consists in this, that in aphorisms, 270, 307, 308, and 324, he speaks of the transpirations of the morning, which he has comprised with that of the night; for, he says in aphorism 350, that the interior parts are moistened during sleep, as had previously been remarked by Hippocrates.

fluenced by a great number of circumstances; exercise, electricity, and the heat of the atmosphere, augment it. Cold air and cold water produce the same effects in men, whose system is capable of a strong re-action. It is not the same with debilitated persons; their debility is opposed to the re-action, the energies are concentrated in the interior, and are there retained by the action of these causes. Nothing is more opposed to transpiration than a sedentary life, the variations of the atmosphere, and cold damp weather. It results from the experiments of Sanctorious, that alimentary substances also influence this excretion. Pork, for example, mushrooms, melons, grapes, figs, strawberries, cucumbers, fish, especially eel, fat and oily substances, drinks taken during digestion, and in general all aliments of a difficult digestion, retard or diminish respiration. On the contrary, well fermented and well baked bread, mutton, chickens, birds, *allium*, &c. augment it in an obvious manner.

The temperature of the country in which one lives, has a decided influence on transpiration. According to the observations of Sanctorious, those who live in Italy transpire five-eighths of the aliments they take; From those of Gorter, the Hollanders lose per day out of eight pounds of aliment, nearly three and an half of perspirable humor. Dodart found that the transpiration varied much in France, but that in general it never equalled the quantity mentioned by Sanctorious, in Italy, but that it was not less than in England.

Copious sweats enfeeble and exhaust the body. Diminished or suppressed transpiration is not less to be feared; it gives place to divers serious diseases,

which particularly affect the organs that secrete mucous, probably owing to the perspirable humor having some affinity with this fluid. What I have just said respecting the diminution or suppression of the transpiration, is applicable to habitual, periodical, or critical sweats; their cessation is extremely injurious, and occasions a great number of severe, and frequently mortal diseases.

The proper means to re-establish disordered transpiration, consists in the use of frictions, the tepid bath, warm and dry coverings, and diaphoretic or sudorific drinks. But they should only be employed in the exacerbation of a fever; when this is once removed, they would only exasperate and augment the accidents.

Exercise is one of the most proper means to promote transpiration; but that it may be the more useful, it should be taken at the period when the matter which ought to form it, is prepared to be evacuated, when the digestion is finished, that is to say, six or seven hours after the repast, or in the morning soon after getting up, as the ancients practised.

The semen is a humor secreted in the testicles, for the purpose of generation, and which, according to the analysis that have been made of it, is composed of animal mucilage 00.6, of soda 00.1, of phosphat of lime 00.3, and of water 0.90. The phosphat of lime is met within it in a chrystalized state. We are ignorant of the cause of this phenomenon, which has not yet been met with elsewhere. Some physicians think that the generative virtue resides in the seminal mucilage, because this mucilage is continually found in

the sperm or seed of animals, whereas the phosphat of lime and the soda does not always exist in it.

The secretion of the seminal liquor does not commence until the age of puberty, and when the growth of the body is already much advanced. Before this period the testicles in men, and the womb in women, are in a kind of sleep, from which these organs are not aroused, until the others are almost entirely developed. The secretory action of the testicles, begins at this period, and increases by the effect of venereal desires and physical stimulus; the semen which results from it, is afterwards carried by the *vassa deferentia* to the vesiculæ seminales, where it concentrates and is perfected; part of it is re-absorbed from this deposit, and the rest evacuated in the act of coition.

The too frequent evacuation of the semen is injurious, not only in consequence of the loss of this humor, a part of which ought to re-enter the common mass, but also owing to the inequality which results from it to the organic powers, and which is such, that during coition, they are almost entirely divided between the genital parts and the external organ, whilst the epigastrium is deprived of them. The diaphragm, in this circumstance, experiences from these acting parts, an increase of resistance, which goes so far as to intercept its action; hence, respiration is shorter and more frequent, which proves that the oscillations of the diaphragm have diminished; this obstacle produces in that organ a proportionate degree of irritation, that causes the action which is momentarily renewed by the effort of respiration, and by the strong



re-action of all the organic parts, to degenerate into a convulsive motion.

Young and well constituted persons are soon relieved from all the disorder occasioned by the venereal act, and the motions soon resume their natural order. But when a person indulges in these pleasures to excess, or when the system is debilitated, he has not the necessary activity to furnish the succession of action, which the exercise of this function requires, and the changes which ought afterwards to be effected, to re-establish the energies in their proper relation; and it gives birth to a want of harmony in the system of the energies, and to an irregularity in the motions, whence result an infinitude of diseases. The abuse of venereal pleasures produces lassitude and debility; it causes beauty and the graces to fade, and when their excess is continued, it soon occasions spasmodic and convulsive affections, a weakness in all the senses, and especially that of sight, a depravation of the mental functions, stupidity, loss of memory, phthisic pulmonalis, dorsal consumption, and death; these evils augment imperceptibly, and become almost always incurable, in consequence of a habit of desires, that one experiences continually for new pleasures; and which, once contracted, is such, that during sleep even the imagination is almost incessantly occupied by obscene objects; thence result polutions which produce a greater or less degree of exhaustion for the organs of generation, the irritability of which is augmented on these occasions, being solicited by voluptuous images, the semen escapes from thence, previous to being sufficiently elaborated.

Solitary pleasures are still much more injurious.

for they in a very short time, ruin the most robust constitutions, and the diseases which are the consequence of them, are much more terrible; they almost always terminate by death, which is accompanied by convulsions and despair. Physicians cannot too powerfully oppose these obscure enjoyments, which are as injurious to nature as to modesty. A virtuous and sensible being cannot consent to be happy alone, and there are no real joys, but those which are divided.

True pleasure, the only one which an honorable man can taste, only exists with the suffrage of his conscience; but each of these enjoyments are marked by a homicide. *Miseri, quorum gaudia crimen habent.* "Flee from pleasures which should be followed by remorse."\*

It is very rare that continence is injurious to health; it has, however, been sometimes prejudicial, and it has even proved fatal to persons of a warm temperament, and who, by a state, or by the effect of a fanatic delirium, dared not to fulfil the view of nature, by engaging in the bonds of matrimony. The acidity which the semen acquires in certain individuals, excites the strongest passions, and sometimes occasions the greatest revolutions in empires. Henry VIII. it is said, was an example of this kind; and it was to the acrimony of the semen of this king, which caused him to experience the most violent passion for women, that England owes the abolition of the Catholic faith. How much would history lose of its nobleness and its dignity, if one knew the secret causes of great events.

\* See article ii. vol. 2. Appendix

Continence gives place, in persons disposed to the pleasures of love, to nocturnal pollutions, which frequently repeated, soon throw the system into a radical enervation, that produce marasmus and consumption. At other times, it occasions inflammations of the generative organs, spermatocele, &c.; and when the strong irritations which these organs suffer are transmitted sympathetically to the brain, there ensues spasms, convulsions, a continual erection of the penis, accompanied with insatiable venereal desires, alienation of mind, and venereal melancholy. Excessive continence frequently produces languor, whites, green sickness, vapors, and nymphomania in women.

The pleasures of love are useful when moderately enjoyed; the art of seasoning the pleasures, in general, consists in being sparing of them. To abstain in order to enjoy them is the philosophy of wisdom, and the epicureanism of reason. We not only double our enjoyments by this means, but we also confirm our health.

True pleasure to the wise belongs,  
To him it is allowed,  
With prudence to enjoy the hour,  
Not revel with the crowd.

Coition, when used with wisdom, promotes transpiration; it renders the body lighter and more agile, it augments the appetite and sharpens the mind. We know it to be useful to the health, when it is not followed by languor or pain. *Scire licet eum (concupitum) non inutilem esse, quem corporis neque languor, neque dolor sequitur.* (Celsus, lib. i. chap 1.)

In the enjoyment of venereal pleasures, it is particularly proper to consult age, the energies and tempe-

rament. Young people who give up to them before the body has acquired its growth, dig themselves an abyss of diseases. It is contrary to the views of nature and to the good of society to marry children too young, as do many inconsiderate parents, who only consult interest and ambition; for the pleasures of love soon enervate them and produce sterility; or, if they have a progeny, they are only deformed, feeble, and feebly constituted beings, who know existence but by pain, and who can be of no utility to society.

Girls who marry at a tender age, become a prey to a multitude of diseases. They cannot support the accidents of gestation nor the pains of parturition, and are very subject to miscarriage. Too early marriage is one of the principal causes of the diseases which afflict the sex, as well as of the depopulation and of the degradation of the human species. "The excesses of youth," says lord Bacon, "are so many conspiracies against old age."

We might add, and against posterity; for it is impossible that children born of enervated parents can be robust and enjoy good health: hence the greater part of them are affected with nervous diseases, scrophula, rickets, &c. Another reason which should induce parents not to marry their children so young, is that after giving themselves up, during the first periods of matrimony to the pleasures of love, with all the transports of their age, they are soon disgusted with each other. The habit of pleasures, as well as their excess, blunts the enjoyment of them, and the inconstant wife soon goes to seek elsewhere new pleasures; and the conjugal faith once despised, there results from it a depravation of manners, which makes new progress



every day, and finally causes the ruin of families, crimes and despair.

The age of marriage was fixed by Plato, to the thirtieth year for men; it is that, in fact, in which the constitution is formed. At Lacedemon, neither sex were permitted to marry until the twenty-fifth year. Tacitus praised the ancient Germans because they did not marry until they had attained full vigor; men attain this vigor between five and twenty, and thirty, and women between twenty and twenty-five. Among the Germans, a young man who lost his virginity before the twentieth year of life, was defamed. The ancient Gauls, had nearly the same customs respecting marriage and the purity of morals. But without being under the necessity of recurring to the ancient periods of the world, to show how much we have changed in these respects, it will be sufficient to relate a known example. It is that of the father of the celebrated Montaigne, who lived at the commencement of the sixteenth century. He married, retaining the badge of virtue, at his thirty-third year, after having borne arms for a long time. We may thence judge, the revolutions which have taken place in the French morals, in the space of two centuries, and of the degeneracy of the species which has been the consequence.\*

It is not less injurious and dangerous for marriages to be badly assorted, as for a young woman to marry an old man, or an old woman a young and robust man,

\* "It is to the manner of raising children, to the vigor of gymnastic exercises, and to the avoiding all premature pleasures, which makes so great a difference between our old men of twenty, and the hero, who in the day, killed lions with his arms, and in the night, impregnated fifty women."—*Phil. de la Nature*, tome ii. p. 14, 15.

and not to consult in any respect, the inclination of their partner. These marriages are as contrary to the views of nature, as they are opposed to happiness. It were desirable, and would be a great means of improving the human species, to permit none to marry but well formed persons, those exempt from bodily deformities, from all diseases and infirmities, and who experience a mutual affection for each other. Another means not less proper, to fulfil the same object, would be to intermarry. The example of animals prove the advantages that would be derived from marrying with strangers. Experience has taught the disadvantages which result from alliances of the same blood. among nations but little civilized, they rarely permit the brother to marry the sister, and this usage is founded upon their observing the human species always degenerate when they wish to preserve them without mixture in the same family. Whence they have justly regarded as a law of nature, that of alliances with strange families. But if such connexions cause a degeneracy of the human species, how much does those with persons of different countries contribute, by contrasting the figures and opposing the climates, to produce new races of men more beautiful and more perfect? Do we not see in large cities, where strangers flock and reside, persons better informed, of a fine figure, and an elegant statue! It is owing to this, doubtless, that the Jews, whose law interdicts all alliance with those who are not of their sect, are so homely, whereas, the sovereigns of Europe are ordinarily very handsome, because they marry out of their country.

Old people should renounce the pleasures of love,

or at least enjoy them rarely. It is dangerous to partake in the pleasures of youth, when the vigor is exhausted. The fibres are necessarily raised above their natural tone, and make extraordinary efforts, which give rise to an inequality of action, and a disorder in the motions that are not easily re-established, and which frequently occasion violent spasms, and an enervation that hurries them to the tomb. More than one old person has accelerated the end of his days, by wishing to bind around him the myrtle reserved for youth, and to sacrifice to Cypris.

Summer and the first of autumn are the most improper seasons for venereal pleasures; we should, in these seasons, but rarely partake in them, because the system is enfeebled and desiccated by the warm weather; winter, but principally spring, are the most favorable periods for these enjoyments. *Venus hieme non pernicioſa, vere tutiſſima; neque æſtate vero neque autumno utilis eſt: tolerabilior tamen per autumnum eſt. Æſtate in totum, ſi fieri poſſit, abſtinendum,* (Cæſus, lib. i. chap. 3.) It is during ſpring that nature re-animates, and that a new fire glides in all bodies, and penetrates them with elements. Every thing is animated; every thing is embellished; every living animal celebrates, by the ſweeteſt transports, the power of love. This god, the univerſal ſoul of the world, pours fecundity and life in the boſom of all ſenſible beings.

Weak perſons and valetudinarians, eſpecially thoſe who have delicate breasts, ought to be very moderate in theſe pleasures, and to ſuppreſs the unruly motions of the fleſh. There is nothing which they can gather, that is more dangerous than the enjoyments of

love; it is to those that these Latin verses are particularly applicable:

*Principium dulce est, sed finis amoris amarus;  
Læta venire Venus, tristis abire solet.\**

As to strong and well constituted persons, "they ought not," says Celsus, "to dedicate themselves to them with too much ardor, nor to abstain from them too abstemiously. These pleasures used moderately, give activity and lightness to the body, whereas when used to excess, they enfeeble and enervate it."†

When the womb has acquired its complete growth, it remains surcharged with a portion of action which was necessary to its development, and it becomes a new centre of sensibility, which has the most intimate correspondence with the epigastrium, and the greatest influence upon the whole system, which frequently predominates over the others. But this organ, truly excretory, does not daily employ the action that it receives for the excretion; it lets it accumulate by degrees, until having arrived at a certain point, this organ, which is very spongy, becomes distended, and imbibes a certain portion of blood, that flows to it in greater quantities than ordinarily, and which it suffers to transude.

This periodical evacuation, that ordinarily takes place once a month, and which remains from three to six or seven days, is established at the age of puberty, and ceases between the forty-fifth and fifty-fifth years, sometimes sooner, and sometimes later. We have ob-

\* At the expected time the minds elate;  
That past it sinks into dejected state.

† Lib. i. chap. 1.



served that the development of the sexual organs produces in men, a revolution, which, by causing the action of the arterial and pulmonary systems to predominate, dissipates the pituitous diseases of infancy. There also takes place at this age, a very similar revolution in the female sex; the womb acquires a new life and irradiation, which is universal, augments the tone and tension of the whole system.

When the development of this organ is made in a proper manner, and when its play is regular, it performs the crisis of the diseases of infancy; but when it is prevented by some obstacles, and the causes are not established, there results an abdominal fever, which holds a middle rank between that of an acute and a chronic fever, and which is known by the name of chlorosis or green sickness. This disease I consider as the product of the pituitous constitution of infancy, which extends beyond the time fixed by nature, and which the constitution endeavors to repress.

The only means of preventing this disease, and that which is the most likely to cure it, consists in making young girls take exercise, and to let them partake in the amusements of their age. We rarely see any attacked with the green sickness and hysterics, but those who remain confined in their rooms, and almost always sitting; whilst those who have the liberty of playing and running in the open air, and who thus support the vivacity and gaiety peculiar to youth, do not experience these diseases. It is proper then that the severe advice of the cold and serious age should not be opposed to the noise to which nature disposes youth, and that it does not spread its gloomy shade

over the spring time of life, destined to plays, laughter, and innocent pleasures.

When a girl has attained the age of twelve or fourteen years, the period when the courses generally first appear, and that instead of these manifesting themselves, we see the health impaired, so far from permitting her to abandon herself to indolence and inaction, and taking profusely of medicines, she should be compelled to conquer the indolence consequent on this state, and to take free exercise in the open air. She should partake in active amusements, and should have a wholesome nourishment which is strengthening and easy to digest. These remedies, as simple as easy to be employed, scarcely ever fail to restore health, and to promote the menstrual discharge. The emmenagogues that are administered in these cases, most frequently disconcert nature, and almost always aggravate the state of the disease.

When the courses commence to flow, during their continuance, every cause which tends to suppress them should be avoided. The sex, during their menstruation, should use wholesome aliments which are easy to digest, and especially to guard against cold, which is among delicate women the most frequent cause of suppression; a degree of cold, which at any other time, would not injure them, is sufficient frequently, when the courses flow, to stop them and injure the health. The passions have also the greatest influence upon this evacuation; anger, fear, grief, &c. frequently produce obstinate suppressions, and a multitude of diseases which are the consequence of it: this is the reason women ought to avoid, in critical pe-

riods, the causes which may disturb the tranquillity of the mind, and give themselves up to gaiety.

When the courses have once appeared, they return every month, about the same period, except in time of pregnancy, or that of suckling. The womb employs from about twenty to thirty days to make its revolution; but when this evacuation fails, or does not flow in a proper quantity, serious diseases result, which are occasioned by engorgements and humoral congestions in the different organs, according to the period of life. It is the same with all habitual periodical evacuations whatsoever, and it is a truth established by observation, that the suppression of the nasal hemorrhage, hemorrhoidal flux, &c. sensibly derange the functions, and frequently occasion death.

It sometimes happens also, that women, instead of having the courses by the ordinary outlet, have them from other parts; this is what is called *misplaced courses*.

In this case, they take place by the skin, lungs, stomach, nose, ears, &c. One may generally succeed in the commencement, in diverting them to the sexual parts; but this can rarely be done, when they have decidedly deviated. Moreover, when the health is not injured, and when the other functions are properly performed, it is better to remain quiet, and leave nature to act, than to administer remedies, which, in these cases, are ordinarily pernicious or useless.

When the menstrual evacuation is excessive, it produces very dangerous affections. The effect of excessive hemorrhages, are a prostration of the eu-

ergies, a slowness of the circulation, and of all the actions, the extinction of heat, loss of color, laxity, and cachexia.

The period of life in which the courses cease, is as critical for the most of women, as that in which they begin to establish themselves. The action, of which the womb is no longer susceptible, in consequence of the age of the person, is directed towards the other parts, and occasions accidents more or less serious, according to the disposition of the body, and according as such and such parts are more or less proper to employ critically this reflux of action. It is consequently, the period in which we see the greater number of women affected with chronic diseases, and perish. But, also, those who pass over this period, and among whom the action which the womb receives, is divided nearly equally among all the organic parts, frequently acquire a better health, and arrive to a very advanced age. Temperance and exercise are the most efficacious means to prevent excessive menstruation, and the accidents which accompany the cessation of the menstrual flux. The courses and their cessation are in the order of nature, and are not diseases; they only become so by excess, violence of the passions, an effeminate and idle life. We rarely see country or common women affected with the diseases dependent upon irregularity, suppression and the cessation of the menses, except those who live a sedentary life, and one similar to women of the cities, or whose manners are irregular. The means of curing these diseases, are not the object of hygiene, and in speaking of them, I should pass the bounds of this course.



## SECTION VI.

ON THE RECIPROCAL INFLUENCE OF THE BODY UPON  
THE MIND, AND OF THE MIND ON THE BODY.

### CHAPTER I.

#### *Of the Sensations.*

THE mind has the greatest influence upon the body of man. The divers affections which it experiences, generate in the system useful or pernicious changes, according as they produce the concentration or expansion of the energies, and as they promote their free circulation, or as they impede it. It is these same affections which determine the will; this arises from the sentiment which attaches us to the objects that act upon our senses, or which induces us to shun them, according as their impression is agreeable or disagreeable. However, the mind is in the closest connexion with the body; for all our ideas and our affections come from the senses, and owe their origin to the commotions of the nervous fibres, which propagated to the brain, produce pleasure or pain.

Sensations are absolutely as necessary to the physical, as to the mental life; it is these which set in action the different centres of sensibility, and which establishes, in some degree, the reciprocal counter-balancing between them; they teach us to know the objects which surround us, and which may contribute to preserve or injure us. The foetus participates in those of its mother, when it is still in the womb; it is only at the period of its birth, that it begins to experience its own in an obvious manner. The agitation and vagrancy of the new born child, are so many effects which its wants and its relations with exterior objects decide, its senses are affected with painful impressions in the first moments of life, but it becomes imperceptibly habituated to them, and finally they are not too irritative. There are none but touch and the gastric senses, which can act the first days; but in proportion as life progresses, the other senses develop themselves, and become active; and we see children rise sensibly to the impressions of sound and light. By degrees the sensitive principle displays its energy, the brain acquires the faculty of retaining the sensations which are transmitted to it, and of retracing them; the soul compares ideas, seizes the relations, and forms judgments. It is at this period that the moral life begins. Man has the consciousness of his existence, and a knowledge of the beings which do not belong to him; he shows an inclination for objects, which experience has taught him are proper to renew the activity of his senses, and to procure him agreeable sensations, and an aversion to those, which are injurious to his existence.

The sensibility, which, as I have already said, is

the element of life, developes itself then with the organs; it is the same with the understanding.

"Prætereà gigni pariter cum corpore et unà  
Crescere sentimus, pariterque senescere mentem."\*

Is the intellectual faculty any thing else then, than the sensibility itself, or the power of receiving the impressions of exterior objects? In fact, the mental operations seem to grow and to extend themselves, at the same time that the organic system does. The thought is active at a certain age; it is influenced by the different states of the body, languishing with it during disease and in old age, and grows weak with the system. However, it does not appear very probable, that intelligence is a property of organized matter; for sensation is not thought, notwithstanding it is the opinion of certain modern philosophers; and there does not exist any relation between the nature of the sensitive principle and that of the understanding. It is much more probable, that the mental faculties are exercised by a real being, an emanation of the divinity, which does not descend into the abyss of the tomb, but which returns to its author.†

\* Besides the body is not born alone,  
Nor grows nor lives when mind and soul are gone.

*Creech.*

† The sensitive principle and the intelligent principle are not the same, for they are frequently opposed to each other. "There is no person, who, in life," says De Seze, page 62, "has not been at the same time drawn by a violent desire, and restrained by a superior reason, who has not been suspended between these two opposite inclinations, at least some moments; who, consequently, has not felt within himself two contrary powers, which endeavor to seduce him, and of which the one has only given way when conquered by a foreign force. It is the *homo duplex* of Buffon, and of which the apostle St. Paul speaks in his epistle to the Romans: *Video aliam legem in membris meis, repugnantem legi mentis meæ.*"

This principle, the nature of which is entirely unknown, contains, no doubt, *virtually*, from its origin, all possible ideas; it requires, so long as it is confined to matter, the aid of the senses, to put these ideas in action, and to perceive them. Such is the reason why it participates in all the vicissitudes and affections of the body; but when it is disengaged from matter, and has recovered its purity and liberty, it has the faculty of realizing alone, and of reproducing every idea by the single act of its will.

Whether we regard sensations as the development of the ideas, the existence of which precede every impression of the objects which surround us, or consider them as the pure effect of these impressions, which give rise to thought,\* it is very certain that during our pilgrimage here, we can only acquire ideas, and communicate with the system of physical and intellectual beings, through the medium of the senses. The more perfect these senses are, the more will the sphere of our knowledge augment and extend. It is then useful to exercise them, and to apply them to objects in a proper manner.

We must not confound the sensations with the sentiment. I here mean, by sensations, the affections of the body, caused by the impressions of exterior objects upon the external senses; and, by sentiment, the impression excited in the soul by sensations; whence, every sensation followed by a sentiment, necessarily produces pleasure or pain.

\* The soul above all knowledge truly is  
The source of pain and joy, delight and bliss;  
But why to know and feel it thus should be,  
E'en to itself remains a mystery.



Every thing which acts mildly upon the senses, gives birth to pleasure; and all those impressions which shock them violently, occasion pain. Pleasure and pain are then, when analyzed, the effects of the sensations, and properly belong to sentiment; these two productions of the sensibility only differ in their degree of intensity, and a great pleasure is a very near neighbor to pain.

All sensations that give place to an agreeable sentiment, which we wish to retain, are called pleasures; and those disagreeable ones, which we wish to keep at a distance or get rid of, are called pains.

The mental effect of pleasure is to determine in the mind a pleasing sentiment, which induces us to wish to continue it. The mental effect of pain is, on the contrary, a disagreeable sentiment, which is accompanied with a desire to do away its cause. The physical effect of pleasure, says De Seze, is to produce in the feeling organ, an erection, a dilatation, and an intumescency; as if it wished to absorb this sensation, and incorporate it with itself. The physical effect of pain is, on the contrary, to contract, to compress the suffering part; as if, by offering the smallest surface, it wished to avoid or shake off the disagreeable sensation which it experiences, or to support it in the smallest possible number of points. However, pain is not without utility; it is the signal of the dangers which threaten our existence, and it frequently strengthens life, when it is weakened, and resists the causes which tend to injure it. It is in this sense that Sydenham has said, *Dolor amarissimum naturæ pharmacum ægro de vita prospicit*. The cessation of pain sometimes takes places, when life is the most threat-

ened, as in cases of gangrene, in consequence of inflammation; then the sensibility becomes extinct in the part affected, and the sensitive principle opposes but feeble efforts to the action of the morbid cause, which tends to its destruction.

In the sensations accompanied by pleasure the sensibility seems to wish to extend itself, and in some measure to spread over all the organs; from its principal centres it radiates throughout the system, and determines numerous currents of oscillations and of humors towards the circumference. In painful sensations, the sensitive principle, far from diffusing itself, on the contrary, concentrates in its centre, and attracts in these the motions of the humors.

We must not suppose, as the mechanical philosophers do, that sensations are purely passive on the part of the organs of sense, or rather, that these are confined to the receiving of the impression which sensible objects make upon them; they not only experience the commotion that substances or bodies communicate to them, but they also combine with a particular one, they re-act upon them, and do not simply suffer their action. Thus sensation is accompanied with a real action of the sensitive principle, which would not happen if this principle continued in a state of inaction. This fact did not escape Van Helmont, when he said "In the schools, sensation is said to be passive and motion active; but I have already shewn that sensation from a power or sensitive being, is produced by action, although the members suffer, subjectively, by the application of sensible objects," (*de Lithiasi*, cap. ix.) Hence pleasure and pain are evidently actions of this preservative principle, which tends incessant-

ly to maintain and prolong the life of animated beings.

The sense of existence is the central point, to which are related all sensations, in the early periods of life, as in the subsequent ages. The senses are continually affected by the objects which surround us, and accordingly as they experience pleasure or pain; it forms inclinations and aversions for these objects; but, as the sensations attached to the first wants of life, are those which affect it the most, and which is the most frequently repeated; it thence follows, and it is an experienced truth, that they impress themselves more profoundly on the brain, and that they give to the energies and to the humors different directions, in order to attach us to the objects of our wants, and to make us avoid those for which we have an aversion or fear. Such is the origin of habits, which are only derived from an innate propensity, that all living beings have for their preservation.

Our first manners are, in the commencement, only habits of the sentiment, that is to say, of the determinations of the action, produced by the desire of enjoying what is agreeable, or of guarding against every thing which has a tendency to make us fear contrary sensations.

In proportion as life advances, other wants arise which emanate from society, and which have also for object, the enjoyment of the things which attach us, and an aversion to those which appear opposed to our happiness. Hence result actions, habits, and manners, which, according as they are useful or pernicious to the general good, and to that of the individual, are reputed virtues, vices, or crimes.

The man who wishes to improve his state of existence, and to enjoy happiness, ought to contract three kinds of habits: 1. Those which tend to preserve the energy of the senses; 2. Those which can advance and extend the progress of reason; 3. Lastly, those which early form his mind to the love of order. To make the senses, the understanding, and the will, contract these habits, is the subject of morals, and the basis upon which social education rests.

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## CHAPTER II.

### *Of the External Senses.*

THE senses at first govern and direct men; they attach his mind to all sensible objects, modify it, so as to make him know the external qualities of bodies, give birth to his thoughts, and, as so many sentinels, watch the security and the preservation of the body.

All the organs of sense have a structure that place them in relation with the physical beings, upon which they are to exercise themselves, and which promote perception in the most advantageous manner. This structure varies according to the different organs, and to the nature of the sensations which they are charged with transmitting to the brain.

The ear conveys to the mind that of sound; the eye that of light and colors, and the images of objects. The smell gives it the perception of odors, and the



taste that of savors. Finally, the touch; this sense universally spread over the body, enables it to perceive and judge the tactile qualities, such as heat, cold, hardness, softness, smoothness, roughness, &c. It is to this sense that belongs the pleasure of love, this lively and ravishing sensation, this unspeakable pleasure, which transports the soul, and produces for a short period the most perfect bliss.

We may range the external senses into two orders: 1. Those which immediately receive the impressions of objects; 2. Those which only receive them mediately. The first have nervous papillæ, more or less prominent and covered with the epidermis; such are the organs of touch, taste, and smell. The others, such as the eyes and ears, only receive impressions through the intermedium of the air and light, and have smooth and polished membranes, which are only nervous expansions.

SECT. 1. *Of Touch.* The touch or tact, is the most general and most simple sense. Its dominion is the most extensive; all animals possess it, from man to the polypus. The whole exterior surface of the body is the organ of this sense, which has for its element a prodigious number of soft papillæ, formed by the pulp of the nerves which ramify into an infinite number, and terminate at the skin covered with the epidermis. The impressions that they receive from external objects, and which they transmit to the brain, give the idea of tactile qualities. Touch teaches us to know the resistance of bodies, their impenetrability, their figure and their extent; it is by it that we receive the first ideas of distances and motions. It is from it that we derive these first

impressions, the result of which is to induce us to avoid, mechanically, certain objects, and desire others, for our own preservation.

Touch is, correctly speaking, but a contact of surface. Cold bodies, by contracting the nervous fibres of the skin, produce the sensations of cold; caloric, by dilating them, excites the sensation of heat. A gentle impression gives birth to pleasure; stronger ones produce pain, or a state very closely connected to it.

Man is the most sensible of all beings to tactile impressions; he possesses the sense of touch in its highest degree, and more perfectly than other animals, in consequence of the fineness of the skin, and of the abundance of nerves which are ramified in this organ. It is to this sense that he owes, in a great measure, the superiority which he has over other animals. Buffon has justly observed, "that it is the most immediately the sense of the mind." At least, it is the first which advertises it of its union with the body; it is of all the senses, the most frequently exercised, the surest, and the most proper to correct the errors of the others. In fact, the ideas acquired by touch, are weak, confused, and difficultly arranged in the memory; but they may be augmented and extended, and given a very great degree of perfection. Jewellers have been seen who possessed this sense in so great a degree of perfection, as to know the qualities of precious stones, solely by the impression which they make upon the tongue; there have been, among the blind, skilful sculptures and great geometers.

It is particularly the hand, and especially the extremities of the fingers, which possess the most exquisite sense of touch, because the organization of these

parts is such, that it is composed of very flexible and very pliant parts; that it may adapt itself to the surface of bodies, embrace them by a greater number of points, and give us juster ideas respecting their form, figure, &c.; we thence see, that the sensation of touch must be weakened and blunted in animals whose epidermis is covered with hairs, and the paws enveloped with a thorny substance, or thick scales; and that those which have no organ analogous to the hand of man, have a very limited circle of perceptions.

We cannot pay too much attention to the improving of the organ of touch, which women, naturally possessing a greater sensibility than men, have in a higher and more exquisite degree; for this sense is the one which is the most proper to enlarge the sphere of human information, and to rectify the illusions into which the other senses may lead us. The use of baths and lotions, moderate labor, and especially cleanliness, are the most efficacious means to accomplish this end. The organ of touch becomes callous by particular affections of the skin, and by severe and habitual labor with the hands.

SECT. 2. *Of Smell.* Smell is the most imperfect of the senses in man; it is much finer in certain animals. The ape knows a woman by means of this sense, let her disguise herself as she may. The dog follows the game at a very great distance, although he does not see it, by the emanations which he smells; and it is this sense which is, perhaps, the cause of his fidelity. The sense of smell is not very powerful in man, and it appears that, if the sense of touch gives him any superiority over all animals, it is because it is less important that they should become acquainted with it. However,

there are examples which prove that the sense of smell may attain in man the perfection which it has in animals. History mentions a Grecian philosopher, who distinguished, by the sense of smell, a virgin from a girl who had given herself up to the pleasures of love. A monk of Prague, who is spoken of in the *Journal des Savons*, of 1684, distinguished in like manner by smelling, a girl from a married woman, and a chaste one from one who was not so. At the Antilles, negroes have been seen who followed men by the scent. Sir Digby speaks of a child raised in the woods, whose smell had acquired so much acuteness, that he perceived the approach of an enemy by it. But having after some time, changed his manner of living, the energy of this sense diminished considerably; however, he still distinguished very well his wife from another woman, by the smell. During the night his nose supplied the sense of sight. It thence appears, that the perfection of smell depends not only upon the organ, but also upon the kind of life one lives, and especially upon the privation of strong odors, which man abuses incessantly, and which injure the sense of smell.

The nose is the principal organ of this sense; it is lined internally by the pituitary membrane. The nares or nostrils, which are divided by the *os vomer*, are covered by this membrane, which is composed of two layers that concur to the perfection of smell. In fact, we observe that the more extended this membrane is, the more exquisite is the smell, as in certain animals, whose inferior parts of the nose are more considerable than these of man. The first layer of the pituitary membrane, which is the internal, is dis-



seminated throughout its extent, with mucous glands that secrete the pituitous humor, and with nervous papillæ, upon which the miasms that emanate from odoriferous substances act. It is during inspiration that the odors act upon the pituitary membrane; which proves, that those who cannot respire through the nose, as in *coryza*, (nose obstructed by a rheum) or when this part is obstructed by a polypus, cannot perceive odors. An observation of La Hire the son, supports what I have here advanced. He relates to have seen a man who avoided the sensation of bad odors, by raising the palate, and by thus destroying the communication which takes place between the nose and mouth.

Besides the olfactory nerve, there also enters in the nose a branch of the ophthalmic. These two nerves communicate, and this is the reason why strong odors excite tears. Whence, it is evident, that the impression of certain odors upon these nerves, may be very dangerous and even mortal, seeing especially the great proximity of the brain.

It appears that nature has placed smell near the organ of taste, to prevent errors. This is why Le Cat and Duhamel have regarded it not as a particular sense, but as a supplement to that of taste. In fact, we are advertised by the sense of smell, of the good or bad qualities of the greater part of alimentary substances.

The blind have no other method of ascertaining these qualities, than by bringing the aliments to their mouths; they act according to the views of nature, who attaches the sentiment of pleasure to every thing which can preserve life, and a disagreeable one to

every thing, which is injurious to it. It is thus that all the plants which diffuse a sweet odor, are *analeptics*, and that those, the odor of which are offensive, are poisons.

*Cardan* thought that an exquisite smell was an indication of sense, because, says he, a warm and dry temperament of the brain increases this sense, and this temperament renders the imagination more lively and more fruitful. It appears that the Romans were of this opinion; they called a man of sense *vir emunctæ naris*, and *Martial* gives them the fineness of smell of the rhinoceros. However, this is not always found correct; we sometimes see idiots have a very exquisite sense of smell.

The sensibility of the sense of smell is blunted and destroyed by the use of strong odors and perfumes invented by luxury. Snuff dries and destroys the tone of the olfactory nerves. "Our smell," says the author of the *Philosophy of Nature*, "would perhaps become equal to that of animals, were it not for the mania for fictitious perfumes, and the use of that amoniacal and corrosive powder, which all Europe for a century seems to have adopted, and which, as strong liquors, gives energy to the mind but for the moment, to conduct it by degrees to stupidity." Consequently, those who wish to preserve and to improve this sense, ought to avoid strong odors, and to abstain from snuff.

Odors have a powerful action upon the nervous system; they excite voluptuous sensations, sometimes fainting and other accidents; they are sometimes also powerful remedies, when the substances which furnish them, are used by a wise and prudent hand; their ac-

tion is the greater in proportion to their increased development. Previous to speaking of their influence upon the animal economy, it will not be amiss to give a succinct idea of the causes, which produce the development of the aroma, or principle of smell, called by Boerhaave *esprit recteur*, and which are air, caloric, light, and the electric fluid.

Air; this invisible fluid is the vehicle of odors, and one of the essential causes of their effluxia, as experience proves. If we place a highly odoriferous substance under the receiver of a pneumatic machine, and exhaust it, we shall soon perceive that the odor of this substance diminishes in proportion as the air is extracted from the receiver.

Caloric is an agent which concurs the most to the development of the odors; it promotes the expansion of the odoriferous principle, which it separates from the other constituent parts of substances, and forces it in some measure to manifest its presence, by the impression which it makes upon the organ of smell. If we warm an odoriferous substance, it soon diffuses an odor, which is the case with certain kinds of wood in the hands of the turner, by the heat which friction excites in these substances. If, on the contrary, we deprive any odoriferous substance whatever of heat, if we put very strong scented flowers, for example, in very damp places, their odor sensibly diminishes.

Light concurs powerfully to the development of the aroma of the most of plants; their odor diminishes in proportion to their being deprived of light. Citizen Gouan, professor in the very justly celebrated school of Montpellier, has observed, that the most odorife-

rous vegetables, deprived of the contact of light, entirely lose their smell in hot-houses, although the heat in these places be supported above the twenty-fifth degree.

The electric fluid also influences the development of odors, as the nice experiments of Bartholon prove. "I placed," says he, "many roots of hyacinths and of jonquills in divers vessels, when the flowers had blown, and had began obviously to grow, and before the natural odor of the plant was perceptible, I electrified some of these vessels. I repeated the electrization some days, every half hour in the morning, and as often in the evening, and I observed after the electrization, that the electrized flowers had acquired their proper odor, which was not the case with the other plants, not subject to the electricity. The electric fluid accelerates then, the emanations of vegetables. I have also observed," adds he, "that the electrized flowers give out the nature of their specific odor more strongly, than non-electrized ones, the latter being examined at periods corresponding with the former, and at a period when the flowers had naturally acquired all the growth and perfection necessary to exhale their odor."

It thence follows, that the more considerable the atmospheric electricity is, the stronger and more accelerated will be the odor of plants; this fact is confirmed by observation.

The odorous effluvia is then a kind of evaporation, which is owing to the causes of which I have just spoken; but a very singular phenomenon is, that although the odoriferous matter is continually resolved in vapors, we never observe any obvious di-



minution in its volume nor weight. The odorous principle is then of an extremely fine, subtile, and volatile nature.

The influence of odors upon the animal economy, varies according to the degree of sensibility, and of the idiosyncrasy peculiar to each individual, as well as to the principles of which the odoriferous substances are composed. Lorry has reduced them to five principal classes: camphorated, narcotic, etherial, acid, and volatile alkaline odors.

The camphorated principle, radical of the camphoric acid, exists in many plants, and appears to be destined to prevent them from putrefying. Acids do not entirely destroy the camphorated odor, which is so strongly adherent to its basis, that other odoriferous substances of a very strong odor, being mixed with it, do not at all alter it. The camphorated odor has a sedative action upon the system; it calms spasms and convulsions; it also possesses an anti-septic virtue.

The sweetest odors are not innocent; the odorous substances which exhale them, give out much noxious air, and contain ordinarily a deleterious principle. The flowers of roses, jessamine, violets, &c. diffuse a noxious principle, to which we must principally attribute a great number of fatal accidents, produced by these flowers shut up in small apartments. Anxieties, pains in the head, convulsions, and swooning, are frequently the cause of these odoriferous exhalations. Persons who have a very irritable nervous system, ought to avoid them with the greatest care; these are constitutionally the most disposed to experience their malignant influence. We have sometimes seen death

even produced by this cause alone. Ingenhouz cites the example of a girl who was destroyed in London, in 1719, by the odor of lilies. Triller has given a tragical history of a young girl, who perished by the odor of violets, and the history of another who was restored from a state of asphyxia, by removing the flowers which had produced it. Every body knows the effect of musk and of saffron upon some persons.

The exhalations of walnuts is supposed to be very dangerous. The noxious principle is unalterable; opium, in which there exists a great quantity of it, never loses its narcotic odor nor virtue; it may be made to undergo some change. Amber, musk, and castor, exhale a noxious odor. It is the same with animal oils, which, according to the experiments of Lorry, only owe their anti-spasmodic virtue to the noxious principle.

Ethereal odors, such as those that exhale from pepper-mint, diseased anise, &c. make a very strong impression upon the nervous system, and which is as sudden as their volatilization; this principle exists in a great number of vegetables; it is only due, in the most of them, to the fermentation that takes place during their growth. The first degree of putrefaction that certain fruits experience, develope, during this process, a very highly characterized ethereal odor. The substances which exhale it, possess an anti-spasmodic and carminative virtue.

The acid aroma is found almost always united to aromatic substances. It is also met with in many sourish fruits. All these substances arouse the senses, produce gaiety, and are friendly to man.

All the odors, which by an acrimony that is peculiar to them, irritate the eyes, and cause the tears to flow, are *volatile alkalies*, or *amoniacs*; the tetradynamia, and especially onions, belong to this class. The amoniacal principle is fixed in these plants, by the means of mucous. Substances which contain this principle, are very stimulant, and may be employed advantageously in many cases. Such are the five classes of odors, to which we may refer the many varieties, that nature and art present us:

SECT. 3. *On Taste.* Taste has its principal seat in the tongue and palate; these organs have, the same as the skin, nervous papillæ, but which project more, and are more extensive; this sense is a kind of tact, but it differs considerably from that of the skin, as regards the manner in which it receives the impression of substances; these, as relate to touch, are purely physical and mechanical, and they are rarely chemical, as respects the organ of taste. The action of sapid substances do not differ essentially in causticity, but only in the degree of energy; for the most caustic substances are those which have the strongest taste, and those which are entirely destitute of causticity, are absolutely insipid. Taste, which is but slightly caustic, is nothing else than an effect of the attraction, which savors, and caustic substances exercise upon the organ of taste, so that it may be considered as a chemical sense, which is diversely affected by sapid substances, according as they are applied with greater or less force, and as far as the size and figure of the particles of these substances will admit. There are, consequently, no sapid bodies, except those, the particles of which are so disposed among one

another, that their tendency to union cannot be entirely accomplished, and that a sufficiency of them remains, to produce a greater or less action upon the organ of sense.

We thence see, what we should think of these hypothetical theories, which reduce the primitive tastes to the number of seven, the same as there are seven colors and seven tones. There are, in fact, no primitive tastes, but a prodigious number of degrees of causticity, from that which alters and destroys the organ of taste, to the least degree, which is next to that of insipidity. Poncelet pretended that tastes consisted in the more or less powerful vibrations of the salts, which act upon the sense of taste, as sounds consist in the vibrations of the air, which act upon the organ of hearing. According to his opinion, the same as sonorous bodies, taste has its generative, predominant, greater, less, grave, acute, even its comma, and every thing which depends consequently upon its consonance and dissonance. Seven full tones constitutes the bass of sonorous music; the primitive tastes are also of the number of seven; these are *acid, insipid, sweet, bitter, bitter-sweet, sharp, and pungent*. But that salts act upon the organ of taste, by producing vibrations, is erroneous. There are tastes which do not belong to any of those that the author designates as primitive, and which partake of none of them. Besides, we see neither progression nor harmonic proportion in tastes, unless we think we can perceive them in all the combinations and compositions of substances.

The sense of taste is subject to many errors; the state of the saliva vitiates it in sickness, and the qualities



of the air cause it to vary; it is less sensible in the morning and immediately after getting out of bed, than at other times; the excessive cold or heat of sapid substances diminishes the énergy of it. There are substances which cannot produce any impression upon the sense of taste by themselves, and which become sapid by being mixed or united with others.

Taste is a sense to which nature has attached the greatest pleasures; but the more delicious the pleasures are which spring from it, the more easy is it to abuse this sense. The man who is a slave to the sense, exhausts the cup of pleasure, and transforms it into pain. Soon injured by means of enjoying it, he finds no other means to excite his palate, than the most violent stimulus; he thus accelerates the term of his days by swallowing slow poisons from the kitchen of Apicius. The man who wishes to enjoy and preserve the sense of taste for a long time, ought to enjoy it sparingly, and never to exceed what is necessary, and to content himself with the most simple aliments, and those that are not acrid.

SECT. 4. *On Hearing.* Sounds are the objects of hearing. Hearing is a precious sense, which unites us to the moral world, in consequence of its being essentially united to speech. It is only by the aid of it, that man can learn to imitate sounds, by means of which he may communicate by speech with his fellow beings, and extend his moral existence; this sense is the foundation of all social institutions; its privation is one of the greatest obstacles which prevents animals from extending the sphere of their knowledge. "The inability," says Condillac, "of beasts to communicate their discoveries and their particular

antipathies, causes each generation to begin the same studies, and they stop after having made the same progress."

The sense of hearing is seated in the interior of the ear, which is a real acoustic machine, of which it is important to have a knowledge.

The ear is composed of three cavities. The first, which is external, and which we see without the aid of dissection, is a kind of conque or funnel. The second or middle cavity, has a tubular form, and is called *alvearium*. Lastly, the third, or that which is situated more internally, has been called *labyrinth*. The conque is the mouth of the *meatus auditorius*; it is partly cartilaginous and partly bony. It is at the bottom of this canal that we find that fine membrane called tympanum or drum. This membrane is situated obliquely; this disposition shelters it from the strong concussions of the air; it relaxes, or is rendered tense by means of a small muscle which lies on its posterior surface.

The alvearium or case incloses three bones, the figure of which has caused them to be called *malleolus* or hammer, *incus* or anvil, *stapes* or stirrup. The handle of the hammer adheres to the drum, by the little muscle of which I have just spoken; the head of it is articulated with the anvil; the latter has two unequal legs, and is supported by the longest upon the head of the *stapes*; the eustachian tube, which is a canal communicating from the mouth to the trunk of the ear, renews the air of the latter.

The interior cavity which has a tortuous rout, is called labyrinth; it presents a kind of vestibulum; three semi-circular pipes and a spiral canal, called *cochlea*;

it is divided into two chambers, the one of which is superior, the other inferior, (the upper and the lower.) All these parts are of a hard consistence, and lined interiorly with nervous filaments, which proceed from the auditory nerve.

The internal ear receives all its nerves from the seventh pair. Each of the nerves of this pair are double, and are distinguished into the soft and hard portion, (*portio-mollis et portio-dura.*) The trunk called *portio-mollis*, which is inferior and posterior to the *portio-dura*, is distributed in the *cochlea* or snail, the vestibulum and the semi-circular tubes. The *portio-dura* furnishes a branch to the *alvearium*, and many others to the adjacent parts.

Sound consists in the vibrations of the particles of the sonorous body. The air, the vehicle of sound, collected by the conque, strikes the drum and communicates the concussions that it has received from the sonorous body to it. These concussions are transmitted by two ways to the labyrinth. The one is, the portion of air enclosed in the trunk of the ear, which, struck by the membrane of the tympanum, transmits its concussions to a fine membrane called *fenestra rotunda*, which answers to the lower chamber of the *cochlea*; the nervous filaments with which this chamber is lined, communicate the concussions to the auditory nerve. The other way is by means of the bones. The hammer, moved by a small muscle of the drum strikes the anvil, and this the stirrup. The base of the latter communicates the concussion to the vestibulum, by means of a membrane upon which it rests, and which closes a little opening called *fenestra ovalis*. This opening which communicates with the vesti-

bulum, forms also a communication with the semi-circular pipes, and the upper chamber of the *cochlea*. The nervous fibres which line this chamber and these canals, communicate the *phonic* impressions to the principal trunk, and by it to the seat of the mind. It is probable that each of the nervous fibres of which the acoustic organ is composed, have their specific tone relative to their size and length, and that they only sound when in union with sonorous bodies, nearly the same as the chord of a violin vibrates without being touched, when another is struck that is raised to the same tone.

It is particularly in the cochlea that the nervous fibres are found to sound; they are of all sizes and all lengths, since the cochlea continues to enlarge from its summit to its base. Hence, the fibres which line the base of the pyramid, are appropriated to the grave sound; those of the summit to its acute tone, &c.

We do not yet know the degree of importance of each of the pieces of which the ear of man is composed; but we cannot doubt that the perfection of the organ depends upon their union. If the bones are not absolutely essential, they are at least of great utility for the perception of sounds; for they are found, according to the observation of the celebrated *Vicq-d'Azir*, in all animals, from the reptile up to man, with this difference, that the reptiles and birds have but one. It also results from the observations of that anatomist, that the semi-circular pipes are absolutely essential to the organ of hearing, since they are found in all animals which possess the faculty of hearing. The cochlea is proper to man and to quadrupeds. Birds which have,



nevertheless, a very acute sense of hearing, are entirely destitute of it.

In general we know sounds under the name of tones, which are divided into grave and acute tones; but these two species of tones are only relative to each other, and the tone which is considered as grave, is acute, compared to another still more grave. It is the same with acute sounds which are grave, when compared to others still more acute. What renders the sound acute or grave, is the greater or less number of vibrations which the sonorous body makes in a given time. The more numerous the vibrations are, the more acute will the sound be, because its vibrations terminate in a less time than those which are less so. For the same reason, of two cords of equal length, equally stretched, but not of the same diameter, that which has the largest diameter, will give the greatest tone. A cord, of which the diameter, (every other circumstance being the same) is double to that of another, sounds to the octave bass of the latter. We observe also, that in cords of the same length, the same diameter, and which are equally extended, the gravity of the sound is as the flexibility of the substance of which the cords are made. Thus a wire of gold gives, every other circumstance similar, the quint of that of iron. Lastly, the gravest sound that the human ear can perceive, is that rendered by a body making thirty vibrations in a second; and the most acute by that which makes in the same space of time, seven thousand seven hundred and twenty-five vibrations. Below the first or above the second term, we do not hear any sound.

Sauveur pretends that a person may distinguish and experience pleasure from the different sensations to which all the tones that are comprehended in ten octaves give place. Euler limited this last number to eight. We may thence judge of the prodigious quantity of different tones that we can distinguish, for an ear made for harmony, distinguishes without difficulty in each octave, forty-three differences or merides.

We can count but seven primitive tones in an octave, for the eighth is to be counted as the first of the second octave. We call octave the interval between two cords, the one of which makes twice as many vibrations as the other in the same time. We call it quint when the proportion is as three to two; quarte when it is as four to three; tierce major, when it is as five to four; tierce minor, when as six to five; sixth major, that of five to three; and lastly, sixth minor, that of eight to five. What I have just said respecting cords is equally applicable to all other sonorous bodies, and is the foundation of music, which has so great an influence upon man. The ancients well knew the power of music. The legislatures included the precepts of this art in the codes which they give to the nations; they used it in religious worship, in feasts, and even in combats. But finally, this art, the object of which was, at first, only to celebrate the gods and heroes, and to soften the manners degenerated: the actors profaned it and made it subservient to the most shameful debaucheries.

Music exercises a great power over the animal economy, and tyrannises, in some measure over sensible hearts. It inspires the soldier with courage, it

smoothes the brow of austere wisdom, it charms tender hearts, and expresses the complaints and sighs of lovers. The consonance of sounds well proportioned, excites joy and cheerfulness; the reiterated dissonance, surprise, fury and despair; the chromatic mode which proceeds by many successive semi-tones, express pain and sadness; the different motions of the airs contribute not a little to restore and calm the mind. A lively and animated tone inspires gaiety; if it is precipitated, it produces indignation and anger; it is thus that tempests and storms announce the wrath of nature; if it is grave, it exalts the sentiments; slow, it disposes to effeminacy and repose; lastly, if it is languishing, it paints affliction, excites pity, and communicates to the heart the germs of melancholy and sadness.

Physicians have used music as a preservative, and a proper means to calm pain, from the most distant period. It was prescribed for Ulysses for the cure of a wound, caused by the bite of a wild boar; and, in fact, it possesses the virtue of re-establishing the tranquillity and serenity of the mind, of obtunding and weakening the sense of pain, and as an agreeable state of the soul promotes the expansion of the energies, and their radiation towards the exterior organ, it may be very useful in all cases of irritation, of spasm and of pain: consequently, it is sometimes successfully employed in these cases. Albert, duke of Bavaria, son of Frederick, experienced a sensible relief in the excruciating pains of the gout to which he was subject, by means of mild music, long continued. Gesner cites the case of an Italian, violently tormented with

sciatic pains, of a years standing, and of which he was cured by dancing music.

This last kind of music has an advantage which is peculiar to it, that of diminishing fatigue. Lorry remarks, that the motions may be continued for a great length of time, when they are aided by rhythm. In fact, there are many young persons who are fatigued with the slightest exercise, who pass whole nights at the dance, to the sound of instruments, without experiencing any lassitude. *Marshal de Saxe* has observed, that the troops were much less fatigued when the drums were beat, than when they marched without music.

It is upon the passions and nervous affections that music has the greatest influence. Whence it is divided into *incitative* and *calming*. Its influence upon the mind has been long known. At the period when they cured the wound of Ulysses by its means, he and Agamemnon confided their wives to the musicians Phenius and Demedore, to support their chastity, by playing to them on instruments of the Doric sort. When Achilles became furious, Chiron appeased him with the guitar; Saul, affected with a nervous melancholy, was cured by the harp of David. *Asclepiades* regarded music as the most efficacious remedy in furious delirium; Aretæus recommended it in religious melancholy.

This art does not only possess the virtue of calming the passions, it has also that of exciting them. "A musician," says Plato, (*repub. liv. iii.*) "learns what are the sounds capable of exciting activity and modesty, of pusillanimity and magnanimity."

But the most striking example that antiquity has



left us, of the power of music to animate the passions, is that of Alexander, whom Timotheus could throw into transports of the most violent fury, and whom he could calm at his pleasure, by changing his tune. Modern history mentions Eric, the good king of Denmark, whom a musician threw with his whole court, into a profound sadness, then into the most lively joy, and lastly, into so violent a fit of anger, that the king, who, from a foreknowledge of the magical art of this musician, had all his arms removed from him, burst open a door to procure some, and killed four men. Amurath IV. who had just massacred his brother, was so much moderated by another not less skillful musician, who was condemned to die, that the latter drew tears from this tiger of an emperor, and obtained not only his life, but that of his friends who were about to suffer the same fate.\*

Music does not, in our day, perform the same prodigies; which is owing to that of the ancients being more expressive and more melodious than ours. It had four very pathetic principal modes; the *dorian*, which was destined to serious and religious songs; the *phrygien* which excited transports of wrath and fury; the *lydian*, which expressed complaints and regrets; and lastly, the *eolian*, which disposed to love and pleasure.

Although modern music has not so great influence upon the mind as the ancient had, it is however capable of producing medicinal effects; and observation proves that it has been useful in many diseases.

Few persons are ignorant that it very frequently cures a kind of melancholy, that is peculiar to the

\* Haller, Elements of Physiology, vol. v. page 304.

southern part of the kingdom of Naples, which prevails especially in summer, and which returns sometimes periodically for many years. This affection has long been attributed to the bite of the tarantula, a species of spider of this country; but it is satisfactorily proved, at present, that it is not owing to this insect. In order to cure this kind of delirium, they play upon the violin or some other kind of instrument, many dancing airs, until one is found which makes some impression on the patient; when the latter becomes animated by degrees, and he afterwards begins to dance; he sometimes dances several hours together. This exercise repeated more or less frequently, never fails to produce the desired effect, and cures either in the first attack, or in the succeeding, when they return.

There are a multitude of observations which prove the efficacy of music in other diseases. The Americans use it in almost all cases, to dissipate fear, to reanimate the courage, and to increase the energies. An organist who was in a violent delirium, was calmed by a concert performed where he was. I have seen the same effects produced by music, on an organist of Besançon, affected with a putred bilious fever and furious delirium; nothing could calm him but a concert which his friends executed in his chamber, during a great part of the day.

Dodart relates, (*History of the Academy of Sciences*, 1707, page 8,) that a celebrated musician was attacked with a continued fever that became more violent and which on the seventh day threw him into a very violent delirium, accompanied with cries, tears, terror, and a want of sleep. The third day of this delirium,

he testified a desire to hear a concert in his chamber; the ignorant physician did not consent to it; however, they performed the *contata of Bernier*. As soon as the first notes struck his ear, his visage put on a calm and serene air, and the convulsions ceased; he shed tears of pleasure, and showed a sensibility for music which he had never previously experienced, and which he did not retain after his cure. He was clear of fever during the whole concert, but as soon as it was concluded he relapsed into his former situation. The remedy was continued; the fever and delirium were always suspended during the concert, and the music become so necessary to this patient, that a relation who sat up with him, had to sing and even dance through the night. In fact, he was cured at the end of ten days, without any other remedy than music. and two bleedings from the feet.

A dancing master of *Alais*, having experienced excessive fatigue during the carnival of 1708, was attacked with a violent fever, accompanied with a profound lethargy, which manifested itself the fourth or fifth day, and soon changed into a furious delirium. The physician, to calm it, had some airs played in the chamber of the patient that were most familiar to him; which perfectly succeeded. As soon as the patient heard the music, he began to figure with his arms the motions of the airs; lastly, at the end of a quarter of an hour, he fell into a profound sleep, during which a complete crisis was formed, that relieved him. (Acad. of Sciences, 1708, article vi. page 172.)

Sauvages; (Tarantismus, Nosol. Method. tom. ii. page 231,) relates having seen a man, who in each paroxysm of an intermittent fever, experienced the

most violent pain in the head, and who was relieved by the noise of a tamborine, which was beat at the side of his bed.

Finally, in more recent times, *Pomme* has employed the violin, with the greatest success to calm violent hysteric fits, to which a young person was subject. It results from these facts, and a multitude of others of the same kind, which would be too long to relate here, that music acts upon the nervous system, and that its impressions are so striking, that one cannot doubt its influence upon the human system, and in the cure of nervous diseases.

It were desirable that this means was more frequently employed, in preference to the drugs which are offensive to nature, and are more frequently injurious than beneficial, in nervous diseases, and especially in hypochondria and divers other species of delirium.

Music constituted a part of the education of youth among the ancients; it contributes not a little to improve the organ of hearing, to preserve or establish the tranquillity of the soul, and to banish weariness, which, for thinking beings, is an evil equal to that of pain; it is an agreeable talent, and a source of pleasure; it cannot be too much recommended to young persons who require amusements. The culture of the fine arts soften and polish the manners.

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Ingenuas didicisse fideliter artes  
Emollit mores, nec sinit esse feros.

*Ovid, ex lib. ii.\**

\* The lib'ral arts, where they an entrance find,  
Softenthe manners and subdue the mind.

*Spect.*



There exists an essential relation between the auditory and vocal organs. Languages were at first but an imitation of the divers sounds of nature, and one can only learn them by hearing them spoken. A deafness from birth is attended with a privation of speech. Consequently, according to the different climates in which men established themselves, the ear lost or acquired a degree of fineness, and the languages felt these changes. In cold, arid, and savage countries, where the inhabitants by intervals hear the dull rumbling of irregular and impetuous winds, where there frequently is precipitated with great noise along the rocks, and at bottom of valleys, enormous cataracts, where the sun melting the ice, which is constantly in these places, produce frightful torrents; the ear contracts the rudeness of the asperity of these sounds. But under a smiling and temperate sky, where regular and constant winds blow, the ear becomes accustomed to mild and graceful sounds.

It is an incontestible principle, that the laxity of the tympanum makes the fluxion of the phonic rays pass with difficulty through the cochlea. It is well known that heat dilates substances, and that cold contracts them. It thence results, that the tympanum ought to be more tense in cold, than in warm countries, and laxer in the latter than former; consequently, we should hear better in the northern than southern countries. But if the sense of hearing is diminished in the latter, the vocal organs are improved, which renders sounds more entire and full. If, on the contrary, the organ of the voice is coarser and more heavy in cold regions, the ear is in those situations the better calculated to perceive sounds. Hence, in two

opposite climates, there is an equilibrium between the organ of hearing and that of speech. The full and extended sounds of the southern languages, strike the tympanum more forcibly, and supply by their intensity the advantages lost by the laxity of this membrane. In the north, the harsh sounds reach the bottom of the auditory canal more shrill, but this being more sensible, perceives the sounds with more ease.

At first view, it would seem that the inhabitants of warm climates should have a stronger voice, which ought to strike the tympanum forcibly, to make it experience the convulsions necessary for the perception of sounds, when it is struck more strongly upon one point, than upon several at the same time. The simple agitation of the ambient air is sufficient to cause a tense cord to hum; if it is slightly extended, it must press upon a large surface. Full articulated words have a similar effect. Besides, as the air is highly rarified in warm regions, the speech should not be injured by respiration. But full syllables are not injured, since one may extend and prolong them without breathing, which cannot be done with harsh and acute syllables.

From what I have just said, we see that the faculty of speech is in relation with the sense of hearing, and that this sense is singularly modified by the air and climate. Hence, the most harmonious languages exist in places where the air is not too rare, where the tympanum is neither excessively tense nor relaxed, and where the vocal organ unites the pliancy and strength, proper to form mild sounds, without, however, excluding all harsh ones, which serve to form a sufficient contrast, and to express

frightful and terrifying objects. It is in countries, the temperature of which is mild, that the languages are spoken, which possess these advantages, and also that of being heard at a great distance by a great number of auditors. The Greeks and the Romans had a sonorous and harmonious language; it was not accompanied, as the most of the moderns, with nasal, harsh, and barbarous syllables, originals of the north; they lived in a mild temperature, and we know that their orators and generals of armies were heard at a considerable distance. At present, even in Italy, the actors are heard easily in theatres, which are much larger than ours.

Hearing has a very great influence over the intellectual faculties; these do not develope themselves in an extensive manner, but remain circumscribed within narrow limits, in a person who is destitute of this sense from his birth. We must not, however, suppose, as the illustrious Sicard pretends, that the dumb and deaf person, without instruction, is a living automaton, in whom it is necessary to open one sense after another, and that he has not even the instinct of animals. He cannot, according to this writer, exercise any intellectual faculty, nor combine two ideas, because he wants the necessary signs to retain them, nor, consequently, acquire the most simple reasoning. Moreover, according to him, the sweet supports of maternal tenderness, and the sentiments of filial piety can never have birth in a child born dumb and deaf.

But if we pay attention to such a child, we shall perceive, that if he is deprived of the use of hearing and the articulation of languages, his eyes supply, in

a certain degree, the place of the first, and the language of action, that of the second. He constantly gives all his attention to the action of visible sounds, which are his natural language, and endeavors to perfect himself in these. In like manner as the child, who hears and speaks, he is sensible from the cradle of the carresses of his mother and his nurse, and far from forgetting them as he grows up, as animals do; he preserves the most inviolable and most tender attachment for them.

Besides, the deaf and dumb not only understand very well among themselves, but they also make themselves understood by persons, with whom they habitually live. Animals even comprehend perfectly their language. "The laborer Brand," says citizen *Bouvier des Mortiers*, (Memoir or Considerations upon those born deaf and dumb, &c.) "passes three-fourths of his time with his oxen; he trains, habitually to the yoke, the most untameable, and these animals, more docile to his goad, seem to do their work with him in preference to all other conductors."

The estimable author whom I have just cited, and who has succeeded in giving a sense of hearing and speech to some, born deaf and dumb, by means of electricity, relates another example of animal society, of which he has been witness, and which merits a place here.

"In the autumn of 1770," says he, "I travelled through the cantons of *Marilais* and of *Saint-florent-le-vieux*, situated upon the left bank of the *Loire*, in which prevailed an epidemic, occasioned by the bad quality of the new wheat. In entering the yard of a large farm, I saw a sheep remarkable for the variety of



his fleece, and by the manner in which he bounded and endeavored to climb along the walls. This animal was deaf from its birth. The farmers who came to sell their flock of sheep at the market of *Marilais*, had reserved this one to amuse a child about eight years old, who was also born dumb; these two beings, whose equal privations seemed to assimilate in the order of nature, were united by habits so strong, that they could not be separated from each other, their society was so intimate, their tastes so similar and so concordant, that human society never, perhaps, accorded more perfectly.

“After having diverted the child all the day, the sheep slept at night at the side of its bed, and it would not have been an easy matter to have removed it from this situation; just so, the child would not sleep without the company of its comrade; the latter, being very fond of the new grain, the pungent taste of which rendered it gay, and made it skip about more than ordinary. The child was not sparing of this provision, still less to satisfy it, than to amuse itself with its follies; but the portion having been this day larger than customary, and its actions so violent, that the animal, become frantic, overturned and broke all in the house, so that they were obliged to confine it in the yard; it was at this moment that I entered. The farmers, to whom I testified my surprise, made me acquainted with all the particulars, which I have just related. If the child, said they to me, only appears in the yard, the sheep will be quiet immediately. I entreated them to satisfy my curiosity on that score. The child appeared, he approached his dear sheep with gestures; he spoke to it in his way, in making very cur-

rious sounds; the animal saw him, ran bleating, gently inclined its head, and its phrenzy expired under the carressing hand of his friend."

The deaf and dumb have feet extremely sensible to the impression of noise and motions; these are rapidly conveyed to the epigastrium; and they advertise in many circumstances, where delicate ears would be insufficient. This sense, peculiar to the deaf and dumb, is no other than touch highly improved; it also belongs to scale fish, which fly the least noise, although they have no ears by which they can perceive any thing.

"I have seen in Province," says the historian of the academy, "a deaf and dumb girl, who was so from her birth, who felt pretty far the noise of the tambour and that of the musketry, by the curvature of the stomach. Perhaps fish have a similar sense, and more exquisite, in some or all the exterior parts of their body." Condillac, in his essay upon the origin of human knowledge, pretends also, that those who are deaf and dumb from their birth, have no memory, but as the animals want artificial or arbitrary signs to recall their ideas, and that they are not capable of reasoning. "Reasoning," says this philosopher, "is forming judgments and uniting them, by observing the dependence which they have upon one another. Consequently, this can only take place, by making use of conjunctions and particles, which express the relations of the different parts of a discourse."

But that animals are destitute of the reasoning faculty, is erroneous; they reason since they compare; judge, since they are susceptible of instruction; and that among them, as among men, there are those in which

this faculty is developed sooner, and is performed in a more perfect manner. Consequently, they reason, they have a memory. To say that reasoning is impossible *without the use of conjunctions and particles, which express the relation of the different parts of a discourse*, is to say, that ideas are preceded by language, whereas, this is only the expression of them; terms being in some measure, as the signs and forms of ideas; to establish these signs and vary the form of them, it is necessary to know all the relations between ideas, in order to give to each one the most proper sign. Before the formation of languages, one knew neither conjunctions nor particles; nevertheless, man reasoned, and it was only by reasoning, according to the ideas of which the impressions of objects give rise, that one found signs, and that languages were formed.

But conjunctions and particles must have been found owing to the latter, because, previous to perceiving the relation of the different parts of discourse, these parts must have already existed in a certain order. Hence, experience and reason equally reject this proposition of Condillac, that we cannot reason without the use of these signs. Moreover, this metaphysician has contradicted himself, for he says, (*Treatise upon animals*,) “the animal has memory; for to contract the habit of judging of smell and of sight, &c. with as much precision as certainty, it is necessary to compare the judgments that it may have in one circumstance with those that it has in another.”

But what proves much better than all reasoning, that the deaf and dumb are not deprived of the exer-

cise of the intellectual faculties, is the history of the deaf man of *Chartres*.

A young man, son of a tradesman, deaf and dumb from his birth, began all on a sudden to speak, to the great astonishment of the whole town. It was known from him, that three or four months previously, he had heard the sound of the bells, and had been extremely surprised at this new and unknown sensation. Afterwards there flowed from the left ear, a kind of liquid resembling water, and he heard very well with both ears. He continued listening for three or four months without speaking a word, accustoming himself to repeat in a whisper, all the words which he heard spoken, and improving himself in the pronunciation, and in the knowledge attached to words. Finally, at the end of this period, he supposed himself calculated to break silence, and spoke, although as yet but imperfectly.

We see that this deaf and dumb person, had the habit of reasoning previous to possessing the sense of hearing. This new man, to whom a vast circle of new sensations were opened, imposed silence on himself; notwithstanding the great surprise with which he was seized, he saw relations, until then unknown between himself, his fellow beings, and the whole world. But humbled by the sense of his ignorance in the novelty of his sensations, he listened to self-love, which bid him keep silence until his ears had taught him to speak, and till his tongue could pronounce words which they had heard. He followed faithfully the plan that he traced out to himself, which could only be that of a thinking being, and of a mind already exercised.



But is speech then so necessary, that we cannot communicate our ideas without it, and can it not be supplied by the language of signs? The solution of this problem is found in the institutions of those born deaf and dumb. Willis in England; Bonnet in Spain; Amman, a Swiss physician in Holland; Pereire, Vanin, then de l'Epee, and afterwards Sicard in France; these great men, whom antiquity would have placed in the rank of demi-gods, and the most of whom died ignorant of their cotemporaries, invented methods by means of which the deaf and dumb might understand and arrive at the most sublime conceptions. If adopted by other men, why might not an intelligible language be formed for all, which would supercede articulate languages, the confusion and abuse of which are so frequently pernicious? Isaac Vossius thought that the human species would be improved by such a state, and that the condition of animals is in this respect, superior to ours, since without interpreters they express themselves sooner and understand one another, perhaps better than we can, especially when we speak a foreign language.\* The language of action was that of the first inhabitants of the world. "Gestures," says Condillac, "motions of the visage and inarticulate accents, were the first means that men had to communicate their thoughts." It might be extended and improved.

We may conclude from what I have said respecting hearing, that it is of the greatest advantage to have the organ of this sense sensible and acute; and we almost always observe, that the intellectual faculties are

\* De poematum cantu et viribus rythmi, page 66.

exercised in a more active and a more extensive manner, among those who have delicate ears. Children who possess this advantage, have ordinarily more wit than those who do not. "We should suppose," says Camus, (*Medecine de l'Esprit*), "that that man of whom Plutarch speaks, who was less charmed with the singing of the nightingale, than with the croaking of the frog, had a false judgment." It is then very interesting to maintain this sense in its integrity, and not to expose ourselves to a great noise which alters and destroys it.

SECT. 5. *On Sight.* Sight has its seat in the eye, which is, at the same time an optic instrument, and an organ of sensation. Of all the senses, this communicates to the mind the most prompt perceptions, and also the most varied and extensive; the ideas of beauty, and the richest treasures of the imagination are the effect of this sense.

The eyes are situated in two bony cavities, called orbits, and each of them is covered with eye-lids, which are elongations of the skin, moved by muscles that are proper to them, and destined to protect the organs of sight from the contract of extraneous substances, and from too great a vivacity of light, which might wound them.

The eye-lids are clothed on the interior with a fine and polished membrane, which by its reflection, covers a part of the globe of the eye. It is to this membrane, the name *conjunctiva albuginea*, and white of the eye has been given. Each eye-lid is lined by a small cartilage, called *tarsus*, which is furnished with hairs, known by the name of *ciliæ*; the latter defend the eyes from the particles that float in the air, and moderate the

action of the rays of light. At the roots of the *cilice*, are secretory organs, which furnish a glutinous and viscous humor, that maintains the pliancy of the cartilages, and prevents their friction in the twinkling, that we frequently make. When this humor is thicker and more abundant than common, it forms what is called *lippitudo*. The superior borders of the orbits, which are in the form of arches, are furnished with hairs, called eyebrows, that arrest the sweat which flows from the forehead, and the particles that float in the air, and which might, by their contact, wound the cornea.

Each eye is moved in every direction by six muscles, four of which are called recti, and the other two oblique. At the superior part of the orbit, towards the external angle, is situated the lacrymal gland, which secretes the tears; these, in a natural state, are forced by the motion of the eye, and the winking of the eye-lids, towards the internal angle, where they are taken up by two little canals, the orifices of which are called *puncta lachrmalia*; these two ducts unite into one common canal, which terminates in the lacrymal-sac; there goes off from this sac a canal, called nasal duct, which goes to the superior part of the nose, and there discharges the lacrymal humor.

The eye is of an oval figure, and is composed of three membranes, three cavities, and three kinds of humors. The exterior membrane, which envelopes the whole globe, is called *cornea*, the second, *choroides*, and the third or internal, *retina*.

The cornea is distinguished into *opaque cornea*, or *sclerotica*, which is the white posterior portion; and into transparent cornea, which is the anterior portion. The choroides is formed of two lamina, of which the ex-

ternal, that touches the cornea, retains the name of choroides, and the internal that of *ruyschiana*. This lamina, opposite the ciliary ligament, extends and proceeds upon the anterior portion of the vitreous humor; this elongation is called ciliary production. The choroides is colored with a black matter, and extends from the trunk of the optic nerve, or the deepest part of the eye, to the edges of the transparent cornea, where it adheres, and goes from thence into the interior of the eye; there it forms a circular plane, pierced in its centre; this portion is called *uvea*, its edges, which are of different colors, iris, and the hole, pupil, beyond which is a white circular line, that is called *ligamentum-ciliare*. The uvea has fibres disposed in straight lines, that extend from the pupil to the cornea, where they are attached, and others that are circular. All these fibres are of a muscular nature, and susceptible of contraction and relaxation. When the straight fibres contract, they augment the diameter of the pupil, and the circular ones, on the contrary, contract it by their contraction. The internal membrane, or retina, is an expansion of the medulary portion of the optic nerve; it lines the eye posteriorly, as far as the posterior portion of the crystalline.

The eye contains three humors of a different density, and three cavities or capsules, which are proper to them; these humors are the vitreous, crystalline and aqueous.

The vitreous humor, which occupies the posterior part of the globe, is transparent, and is contained in a multitude of cells, which communicate with one another, and which are enveloped in a common, extremely fine, membrane; this humor obtains its



name from the great resemblance that it has to liquid glass.

The crystalline is a firm transparent substance, of the figure of a lens, which occupies the middle of the eye; it is also covered with a fine and transparent membrane.

The aqueous humor is enclosed between the crystalline and the anterior portion of the cornea. The cavity which contains this humor, is divided into two chambers, of which the one is anterior, and the other posterior; these two chambers, which communicate together, by means of the pupil, are only distinguished by the uvea. The aqueous humor can be repaired; it is not the same with the others.

These three humors have not the same density; the aqueous humor, which has nearly that of water, is less dense than the other two; the crystalline is the most dense; the vitreous humor is more so than the aqueous, and less so than the crystalline.

Light comes in a right line from luminous bodies; but its rays are refracted, according as the medium through which they pass, is more or less dense. If the medium is very dense, the rays incline in approximating to the perpendicular.

They depart, on the contrary, from the latter, when the medium is rarer; this is what is called the refraction of light, which always occurs when the luminous rays pass obliquely from one medium into another of a different density; for it does not break and change its direction, when it falls perpendicularly from one medium into another.

The rays of light suffer, in the eye, three refractions, the first, in passing from the air into the aqueous

humor, that is to say, from a rarer into a dense medium; the second, in passing from the aqueous humor into the crystalline, which is denser than the first; the third, in passing from the crystalline into the vitreous humor, which is not so dense as the crystalline. Hence, according to the laws of the refraction of light, the first and the second refraction that it undergoes in the eye, causes the rays to approach the perpendicular, and the latter, to deviate from it.

Light possesses not only the property of being refracted, it has also that of reflecting from bodies upon which it falls. 'There goes off, from all points of objects, rays of light which bear the image of these points. These rays tend to separate from one another, but they converge when they meet with denser or more convex mediums, and their union is accelerated in proportion to the density or convexity of these mediums. If we place a glass in an opening made in the window shutter of a dark chamber, and present a pasteboard to this glass, we shall immediately have a picture on which all the exterior objects will be painted with the greatest precision in an inverse position, and, according to perspective rules, the shadows reflected on this picture, will even be in motion if the objects are so. If we substitute for the paper a beef's eye, recently stripped of its envelopment, we shall see upon the membrane which covers the bottom the same picture as the preceding, but in miniature. We may by this means, see a country of several leagues painted upon a vellum of a few lines.

The structure of the beef's eye is the same as that of a man's; hence, we already conceive the mechanism of vision. The humors of the eye are the glass of the ob-

scure chamber; the membrane or the retina, is its thick paper. The black color of the interior of the globe, performs the office of the shutter, which keeps out the light; it absorbs the rays, the reflection of which would render the image confused.

The pupil by contracting or dilating, according as the light is stronger or weaker, moderates the action of the rays which cross one another, and which paint upon the retina the images of objects inverted, so that the dimensions of these images are nearly proportioned to the angles formed at the entry of the pupil by the two rays which go off from the two extremities of the object, or what is the same thing, the size of the image is in an inverse proportion to the distance of the object. The concussion of the fibres of the retina, produced by the image transmitted to the brain, give birth to the perception of objects, with their form and colors. It is very probable, that each of the bundles of the retina is composed of fibres analogous to the seven primitive colors of light, and that it is to the seven specific actions of the seven colored rays upon the fibres which answer to them, that the perception of colors depend.

The retina then is the principal organ of vision, those who pretend that the choroides is, are in an error, for the image of objects is not painted upon it, whereas they are painted upon the retina; and besides, it has no medullary nervous substance which can transmit the sensible impressions. The experiments of Mariatte, therefore, only prove, the utility of the lateral insertion of the optic nerve, for the image is painted upon the exterior part, and the optacle axis is not met with at the entrance of the nerve.

The images of the objects are painted upon the retina, in an inverted position. How happens it that we see them in a proper situation? It is because we always refer the object and its divers parts to the extremities of the visual rays, and in a direction which is affected by the rays which fall upon the inferior part of this membrane; hence the rays which fall upon the inferior part of this membrane, terminate at the superior part of the object, and those which attain the superior part of the retina, at the inferior of the body which we look at. We ought then to see objects in their true position, and not in an inverted one, as they are painted upon the retina.

We may in general, distinguish two kinds of sight, that which is distinct, and that which is confused. We see objects distinctly, when the retina receives precisely in the point of their union, the rays of light which they give off. We, on the contrary, see them confusedly, when the retina receives these rays before or after their union; thus in persons who have a good organ of sight, the crystalline lens, by means of the ciliary ligaments, becomes sometimes more and sometimes less convex. It becomes less convex when we look at objects at a distance; and it becomes more so, when we look at an object that is near the eye. The more distant the object is, the more do the rays of light, which it sends off unite, after having undergone in the eye the three refractions; and it is in order to retard this union that the crystalline lens loses, in this case, its convexity. It is for the contrary reason that the crystalline augments in convexity, when one wishes to see distinctly an object which is but few steps from one.



We thence easily conceive the theory of the *myops* and of the *presbytæ*. The *myops*, or those who are short sighted, only see objects well which are almost under their eyes; the *presbytæ*, such as the most of old people are, only see distinctly, objects at a distance. The *presbytæ* are remedied by means of convex, and the *myops* with concave glasses. Of which the following is the reason, with age, the crystalline lens become flattened and lose nearly all their convexity; but convex glasses refract the rays of light, as the crystalline lens do in a natural state, and consequently, supply the place of it. As to the *myops*, their crystalline lens are too convex; they unite almost continually the rays of light which they have refracted. They then require concave glasses to retard this union.

There is another disease of the eyes which deforms the finest visage; it is the *strabismus* or squint eye. This affection is owing to an inequality of strength in the eyes, which habit has produced or that they have possessed from birth, or which has been occasioned by accident. When this inequality is not very great, nor the habit old, the defect may be corrected.

The experiments of Buffon prove, in an incontestible manner, that *strabismus* only depends upon an inequality of strength in the eyes. He presented two children who did not know how to read, round, triangular, and square points, by making them close alternately, one of the eyes. One distinguished at a greater or less distance the form of the object, but both of them had eyes unequal in strength, so much so that they could not see with the weak eye more than one third the distance that they saw with the strong one,

and the eye which was the most deformed was also the weakest. Moreover, when the good eye of these children was covered, the weak one obliged, them to labor, change the direction, and elevate it to point towards the object, as the other eye was accustomed to do. It thence follows, that strabismus consists in a diseased disposition of the organ, which is such, that when one of the two eyes is directed towards an object, the other separates itself from it, because it is too weak to view it directly, and that in wishing to view the object, it would render the image confused; the weak eye is then useless to those who squint.

The squinting of those whose eyes are most unequal in strength, have the weak eye turned towards the nose; these are incurable. Those who have the weak eye turned towards the temple, may be cured; such are young children. When the light comes on one side, the eyes seek that direction, and turns towards the temple. The remedy consists in directing the cradle towards the light, so that the child may have it fully in the face. In despite of this care, it sometimes happens, that the eyes of the child will be deranged, in consequence of the great inequality of the natural strength; to remedy this, the good eye should be covered with a bandage of black stuff; the weak eye being then constrained to act, it turns directly towards the object, and is strengthened by being exercised; this means succeeds most ordinarily, when the inequality is not too great. Instruments called spectacles or goggles, are also used for the same purpose.

The organ of sight has so much the greater need of being improved, when it is naturally liable to

deceive us. It is only in proportion as it is rectified by the touch, and by the habit of judging well, that it does not lead us into error; otherwise it deceives us respecting the extent, figure, swiftness, distance, and properties of substances or bodies. We know the history of the blind person aged forty years, upon whom Cheselden operated for the cataract. He saw, at first, but a colored light, without being able to distinguish a globe from a cube, and without having any idea of extent, distance, figure, &c. He thought all objects near his eye, and it was only by touch and experience, that he learned to judge of objects that he saw.

The exercise of the organ of sight contributes greatly to the excellence of the senses; the wild animal has it very good, because having continually great distances to travel, it is fortified by exercise, and by the incessant necessity of measuring and judging of the distances. It is the same with the savage man, whose mode of life obliges him to view perspectives at a great distance.

This is the reason why huntsmen, the inhabitants of the country, and especially mountaineers, have generally a better sight, than those who live in cities.

The sense of sight has more intimate relations with the brain, than the other senses. The optic nerve is an immediate elongation of the medullary substance; hence, the sphere of activity of the eye is much more extensive, and this organ retains much longer the impressions that it receives, than the others do; but it is, of the senses, the one which is the first affected by affections of the brain. We thence easily conceive,

why the large cities of Europe are peopled with blind youths, the sensibility of whose brains has been injured by the premature use of pleasure; add to this, that the perspectives of citizens being very limited, they have much less occasion for developing the sense of sight, than those who reside in country situations, and that every thing which surrounds them, as the reflecting lamps, multiplied lights, &c. uselessly exhaust their sight without extending it.

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### CHAPTER III.

#### *Of Speech.*

MAN communicates his thoughts by means of speech. The beasts which are as inferior to man by the organization, as by the nature of the spirit which animates them, are deprived of this faculty, which contributes the most to the progress of the human mind. "It is it," says Condillac, (*Traite des animaux*,) "which presides in societies, and over a great number of customs, which man who lives alone, never contracts. Admirable principle of the communication of ideas; it causes the spirit which gives birth, increase and success to the arts and sciences, to circulate."

The organ of the voice is an admirable instrument, which merits the attention of the philosopher. At the bottom of the throat, and above the *trachea arteria*, is a compound machine, the *larynx*, at the centre of which is an opening, called glottis; this is covered



with a small cartilage, called *epiglottis*, which can raise and lower itself as a drawbridge, to open and close the canal. The air which is expelled from the lungs during expiration, is obliged to pass through the narrow opening of the glottis, and it is from the pressure of this air against the lips of this opening, that depend, in general, the formation of the voice.

The ancients considered the vocal organ as a wind instrument, and supposed the diversity of tones to depend upon the difference of the opening of the glottis. When this opening augmented, the tones were grave, and when it diminished, they were acute. But it is satisfactorily proved, at present, that the organ of voice is both a wind and corded instrument, and partakes more of the nature of the latter than the former; in a word, it is a *pneumatic discord*.

At each lip of the glottis is fixed a tendinous and elastic appendage, which different cartilages move by muscles, proper to shorten or lengthen, extend or relax it, nearly as the peg or pins of a violin or harpsicord; and it is to these different tensions or elongations, that the diversity of tones depend; these glottidean appendages are true vocal cords, that cause the air expelled from the lungs, to vibrate, and which exercise the function of the bow of a violin.

This information is not the simple result of anatomical inspection. Ferrin, to whom we are indebted, has made, with the dead animal, the same sounds or cries, that they make during life. After having detached from the corpse the trachea with the larynx, he blew strongly in the trachea, at its inferior extremity, in extending, in a greater or less degree, the glottidean

appendages; and immediately one heard the cry peculiar to the species of animal on which he operated, and this cry was more or less acute or grave, according as he tightened more or less the vocal cords. Moreover, if we give to the glottis a large opening, whilst we shorten or extend the same cords, we shall not obtain a grave, but acute sound. Lastly, the accord of the sound will not vary, if the cords remain equally tense with the different openings of the glottis. We see in these experiments, the vocal cords, as those of a musical instrument, make a sound, and we may make, at the same time, or separately, different tones. We may, for example, make the sound of an acute octave of the one, with the grave of another, the tierce, quinte, &c. by dividing differently their length.

Speech, as well as the voice, is formed in the larynx; it is only the voice diversely modified by the organs of the mouth and nose.

The tongue is, no doubt, the organ which concurs most to the articulation; for it forms not only the guttural words, but also the dentales, and the soft gutturals. However, men have been seen to speak, who have lost their tongue; but it was remarked, that they fixed the sides of their mouth, in the form of a caruncle, which performed the functions of the tongue, when they spoke. The palate is also necessary to speak well. Those who have it not, or in whom it is divided, have a squeaking, nasal and disagreeable voice, as well as those who have too open a nose.

The frontal sinuses serve also to modify the voice, and to render it sonorous; these cavities are to the voice, what the body of the violin is to the cords.

When the palate is applied to the opening of the *posterior nares* in the mouth, and prevents the air from passing into these sinuses and the *antrum himorianum*, there results from this obstruction a nasal and disagreeable voice.

When children begin to speak, they at first imitate the labial consonants,\* because they are the most easy to express, and are only formed by the exterior organs, they acquire by degrees the faculty of articulating the linguals, afterwards the nasals. Finally, the gutturals are the last that they learn to articulate.

The tones are to singing, what letters are to speech; but their formation is not the same. They experience no modification in the mouth nor in the nose. But when one wishes to combine words with singing, the principle of tones, free in the glottis, is converted into the elements of speech, because the different tones, in escaping by the mouth and nose, are modified by the action of the lips, teeth, tongue, and nose, in the same manner that speech unaccompanied with singing is formed.

The languages have a real influence upon the physiognomy, for the organs of speech are formed by language and for it. The frequency of vowels and of diphthongs, the guttural sounds, and the divers hissing of the dialects of the north, give to the throat, the tongue, muscles of the mouth, neck, and cheeks, a motion and habit which necessarily influence the exterior forms of these parts. When I was at Strasburg, I observed that those who speak the German language coarsely, have these muscles in a state of

\* We distinguish consonants into labials, linguals, nasals, and gutturals, according as the lips, tongue, nose, or throat, contributes to their articulation.

habitual contraction, and that their visage is distorted when they express themselves with vehemence.

Stammering and a bad voice are defects which it is possible to remedy by taking them in time. The first of these vices consists in the difficulty or impossibility of pronouncing certain syllables or certain letters; those who experience this difficulty, are stopped suddenly, as if the voice found an obstacle. Stammering is owing to a bad conformation of the organs of speech, or to a bad habit contracted in early age. What is singular, is that the most of stammerers cease to be such when singing, and that they then have distinct well articulated pronunciation, and without a defect of prosody. Which confirms the opinion of J. J. Rousseau, who thought that stammering was always a vice of education, except in cases of disease. Demosthenes corrected this defect in himself, by declaiming with small stones in his mouth. It appears to me, that we might employ music at an early period, more usefully and with more certainty, and afterwards declamation to remedy this imperfection.

The defect of the voice is not, ordinarily, a vice of the organ of the voice. The seat of the evil is in the ears; there is in these an inequality of strength, so that each of them experiences an unequal sensation; a person necessarily hears incorrectly, because he sings as he supposes others sing.

This theory is founded upon the experiments of Vandermonde, which may be repeated upon all children who have a false voice, in order to find a remedy in this tender age, when the organs may still be subjected to modification.

This physician chose a clear day and a spacious



place, in which he repeated the following experiments; he closed indifferently one of the ears of the person upon whom he made the experiments, he afterwards put him at such a distance from himself, that he did not hear the repetition of the sound of a watch which he held in his own hand, or at least, scarcely heard it. Then stopping it, he went immediately to the person, unstopped the ear which had been closed and stopped the other, making him keep his mouth shut in order that the sound might not reach the ear through the *eustachean* tubes. He returned to his place, and set the watch a going again. The person subjected to these experiments then heard. Vandermonde made signs that he should go still farther off, until he was no longer able to hear. It results from this experiment, that the defect of the voice depends in reality upon the inequality of the strength of the ears. The manner of remedying it in children, is to ascertain by this experiment the weakest ear, and to exercise it frequently, but not to fatigue it. In exercising it thus, it gains strength, whilst the other always preserves the same degree of strength. We thus render from time to time, hearing to the child, by making him sing, and by ascertaining whether the two ears have the same degree of sensibility.

## CHAPTER IV.

*On the Passions, or on the Influence of the Mind upon the Body.*

THE illustrious Pope has justly said, (*Essay on Man*,) that the passions are modifications of self-love. In fact, the preservation of man is the centre towards which all his affections and all his actions converge; he inclines strongly towards pleasure, which maintains or augments the quantity of life that he possesses; and he avoids every thing which can injure him. Pleasure and pain are then the generative elements of all the passions, which may be reduced to two, love and hatred.

Pleasure is only momentary, we judge of it by its intensity. Its duration establishes happiness.

The first degree of pleasure is gaiety or cheerfulness. If this sensation is more lively, it is joy; if it is carried to its maximum, it is pleasure. The interval which separates the latter from pain is almost imperceptible; these two sensations are in some degree in apposition.

The greater the pleasure a person experiences, the greater is the apprehension which he has of being deprived of it; this is the origin of fear, which is ordinarily accompanied with hope, because these two affections have a common source, the probability of good and evil. Fear gives way to sadness, when hope is destroyed, but if we only see in time to come a series of endless misery, then our sadness

is changed into despair, and our existence becomes odious.

It is self-love which makes a man pursue with avidity, objects that increase his happiness; thence curiosity. Naturally inconstant, he wishes to vary his agreeable sensations; and his curiosity once satisfied by a new pleasure, he experiences for it the sentiment of admiration, which in a man of talents is converted into enthusiasm; this sentiment is the admiration of great souls. It is not the same with weak minds; they envy in others the blessings which they do not possess themselves. This passion, envy, is the greatest pest of social order. I will pursue no farther self-love. It is sufficient for me to have explained the manner in which the passions are formed.

We have seen the influence of the physical sensations upon the animal economy, according as they are agreeable or disagreeable. It is the same as respects the passions. When the mind is agreeably affected, it produces an expansion, an intumescence in the fibres; it dilates the epigastrium; it causes the energies and humors to flow to the circumference. When it is disagreeably affected, it condenses the exterior organ; it contracts the epigastrium, and the action concentrates in this part of the system. The passions then produce the same effect that a mild heat or a severe cold does; hence the transpiration is diminished in hatred and sadness, and augmented in pleasure. We also observe that a diminution of this excretion, occasioned by the action of physical causes, as by aliments, cold, damp weather, produces sadness and melancholy, whereas the causes which promote this function dispose to cheerfulness, pleasure, and voluptuous-

ness. We remark also, that the habitual concentration of the energies in the epigastrium, produced by painful or other causes continued, renders the character gloomy and malicious, whereas the liberty of the functions and the expansion of the energies, dispose to agreeable sentiments, and gives that cheerfulness of temperament peculiar to persons who only breathe pleasure, and whose hands are only occupied in gathering flowers. "*Florida antoniorum facies*," said Cæsar, "*neminem terret; flores intertexunt, et sicas nunquam acuum; vultus illos macilentos et adustos reformido.*"\*

Some cold moralists have improperly condemned the passions, and have wished to make man a dispassionate being, an automaton, in order to conduct him to perfection. It is as impossible for a man to live without passions as to exist without thought, they are necessary to life. "The heart of a man," says Juvenal, "has an horror for the state of vacuity."

It is only the abuse of the passions which is condemnable. The functions of the body cannot exercise themselves in a proper manner, only as long as the epigastrium receives and sends back freely the action; consequently, the affections of the mind prevent the concentration of the energies, and promote their free circulation, and in this respect they are absolutely useful to life. I am here only to be understood, as speaking of the moderate affections, and not of extreme passions, which are very dangerous, and which carried to a great degree of excess, may occasion death as soon as experienced.

\* The rosy countenance of such men as Antonia, excites no one's dread, it designates the voluptuary and not the assassin; but the meagre and gloomy aspect is fearful and suspicious.



Agreeable passions, carried to excess, are not exempt from danger. Extreme joy may produce on the epigastrium the same effects, even in a more intense degree than pain, and suddenly occasion a spasm, which intercepting every vital irradiation, causes death with the suddenness of a thunder bolt. Diagoras expired with joy, at seeing his three sons return conquerors from the olympic games. Sophocles died with pleasure on receiving a wreath or crown, to which he was very far from having any pretensions. Polycrates, Chilo the Lacedemonian, Philippedes, Dionysius, perished from excessive joy. Pope Leo X. had the same fate, and died suddenly with pleasure, on hearing the news of the misfortunes that had happened to France.

It is necessary to remark, that the most of the sudden deaths occasioned by the passions, are peculiar to old age. Which will not appear astonishing, if we recollect that in this age, the vigor of the body is considerably diminished, and that the energies and humors naturally tend towards the epigastrium. Consequently, the effect of strong passions is to attract them towards this focus of the sensibility. It thence results, that the epigastrium retaining all the action, this degenerates into a spasm, which occasions the greatest discord in the motions, and which sometimes suddenly arrests the motions of life. The same passions are less to be feared in youth; they only produce commotions in the system, and the energies of sense are more capable of supporting the violent shocks of the powerful affections. The epigastrium which at this age, easily reflects the energies towards the circumference, is less disposed to retain them, and, consequently, to

promote the dangerous effects of the passions. It is only in general, the moderate affections that are exempt from dangers. However, they should not be long continued, especially if they are of a painful nature; otherwise they give place to very serious physical evils, if they do not by their violence produce sudden death. Their effect, as we have said, is to determine the currents of oscillations and the humors towards the epigastric organs. When this determination is constant, as it happens when the passions are painful, such as hatred, sadness, fear, anxiety, &c. are prolonged for a certain space of time, embarrassments are formed in the viscera, and especially in the system of the vena porta, which as the ancients have very well observed, is the source of the most of diseases, *porta malorum*; the humors which stagnate there, become altered, and form in these organs, affected with spasm, focuses of irritation and corruption, which throw irradiations in the different parts of the system, and give rise to many severe diseases, such as acute fevers, gout, melancholy, &c.; and these diseases manifest themselves so much the more promptly, and in a more intense degree, when the affections of the mind have been the most constrained, or the longer seated and retained,\* and when their action is increased by other causes, such as errors in regimen, vigilance, the seasons, sudden variations in the temperature of the atmosphere, progress of age, &c.; which promote the

\* In the constrained affections, spasm seems to combat spasm. If we compare them with those in which a man gives himself up freely to all the sentiments of grief, and vents his pains by complaints, sighing, and tears, we shall see what torment and what violent spasm the diaphragm ought to experience in persons afflicted, and who are obliged to conceal the dart which wounds them; and frequently even to feign a contrary sentiment.

flow of the energies, and their concentration in the epigastrium.

Let us not forget an important consideration, that of a sudden change of one affection into another. When this change is made successively and by degrees, it disturbs and disconcerts the motions to a less degree, it is not so dangerous; but when it is made rapidly, and as by surprise, from one strong affection to another equally as strong, but of an opposite nature, there results a greater concentration of the action of the epigastrium, and frequently a mortal spasm. We know the history of the two women, who seeing their sons, whom they had thought dead, return from the famous battle near the lake Trasimenus, in which the Roman army was cut to pieces, who passed suddenly from the most agonizing grief, to the most sudden joy, and perished immediately. There thence results a very useful corollary, which is, when we wish to cure a person of a passion, we should avoid rapid passages and sudden changes. Joy is not the remedy of grief, nor love that of hatred. In order to calm strong passions, it is at first necessary to appear to partake in them; by partaking in them, we weaken them, and by weakening them, we finally extinguish them.

Although the passions resemble each other in general, by the identity of action, to wit, the greater or less powerful concentration of energies in the epigastrium, or their expansion, they have, nevertheless, each of them specific effects, which give them a distinctive character, and a kind of physiognomy.

The mild and peaceable affections, as *gaiety*, *moderate joy*, *hope*, and *friendship*, throw numerous vi-

tal irradiations in all the organs, and determine the current of oscillations and humors towards the circumference; they accelerate the circulation, but by a gentle, easy, and equal motion; the pulse is full, but soft; all the functions are performed with facility, and with a sense of pleasure; the face colors and acquires the vermilion, the eyes become animated, all the traits distend, and announce the happy state of the soul. It is not the same in excessive joy; it accelerates, in fact, the circulation, but by shocks, and is frequently expressed by sobbing or sighing, the same as violent chagrin or grief; one feels then in the epigastrium, a greater or less contraction, which sufficiently indicates spasm in the diaphragm; the visage turns pale, the hands tremble, and the legs give way under the body, sudden fainting, and, as we have said, death is sometimes the consequence.

*Sadness, slow chagrin, or grief, and religious melancholy*, cause the epigastrium to feel a painful oppression, which we designate by that common but correct expression, *an oppression of the heart*; this spasmodic construction, which is the effect of the concentration of the energies, impedes the action of the lungs, and causes sighing. One would suppose that all the energies have abandoned the exterior organ, when the system is thus afflicted; the pulse is contracted, small, sometimes slow, and at others frequent, but always irregular; the secretions and the excretions are diminished, and especially the transpiration; the visage is deformed, and paints the painful state of the soul, which, however short a time it may continue, soon produces hypochondria, nervous fevers, and other similar diseases, depending on the discord in the mo-



tions, and irregularity in the actions. We have sometimes seen persons die in a very short time, by the effect of violent chagrin or grief. Doctor Fernel died, in very short time, from grieving for the loss of his wife. Pope Clement VII. died in a similar manner, from receiving a severe letter addressed to him by the university of Paris. Racine and marquis de Louvois did not live long after they fell into disgrace with Louis XIV. Marcellus Donatus and Paul Jove relate, that in the war of Ferdinand against the Turks, there was a young man who fought with so much valor, that he excited the admiration of both parties; he finally fell under a number of enemies; they were desirous to know who he was, and when they had removed the sight of his head-piece, he was known by his father, who remained motionless, his eyes fixed upon him, and fell dead, without saying a word.

*Anger* is a strong passion, which results from the union of hatred and a thirst of vengeance. Enmity differs from it by a slight degree of violence; it is anger weakened, and a continued desire of revenge; it disturbs the mind, and deforms the visage in a horrible manner; it precipitates the circulation, and gives the blood a strong tendency towards the face, which it reddens and inflames. At other times, the spasm is general, and so violent, that the face turns pale; the mouth froths, and the eyes sparkle; the pulse is full, strong, and frequent; sometimes also little and contracted, but always irregular; the members tremble, the respiration is impeded and interrupted by frequent sighs.

We see by the symptoms manifested in anger, how dangerous and injurious this passion is; it par-

ticularly influences the hepatic system, and frequently produces jaundice; it sometimes occasions fatal hemorrhages, and ruptures cicatrices; it causes inflammations, acute fevers, and apoplexies; it has frequently been seen to occasion epilepsy, convulsions, and other not less serious nervous affections. Moreover, the examples of those who have died from anger, are not rare. Valentinian I. reproaching the deputies of Bohemia with their ingratitude, became so much enraged, that he lost that moment the power of speech and died. King Wenceslaus was struck with an apoplexy, which occasioned his death in a few days, from being violently enraged with a man, who had not informed him of the troubles excited at Prague by Ziska. The emperor Nerva died in the same manner with a fit of anger. I have seen two women perish, the one in convulsions, at the end of six hours, and the other suffocated in two days from giving themselves up to transports of fury.

Anger is a passion that is only to be conquered by a good education and sound morals; it produces, as we have seen, the most terrible effects; it has, however, been sometimes useful, and has cured many cases of palsy. Hippocrates says that it is not injurious to the pituitous, and that it may even be of advantage to them. It is the same with all the strong passions, provided they are not immoderate, because by augmenting the motions, which are naturally slow in these constitutions; it promotes the free circulation of the energies. Moreover, we have less to fear from the effect of strong affections in the pituitous, for they do not possess a great sensibility, and are with difficulty excited.

*Dread* and *fear* produce a sudden contraction in the epigastrium. The respiration is disturbed and interrupted by sighs, the heart palpitates, all the blood and humors are strongly propelled to the interior, the visage becomes pale, the whole body trembles, the legs give way under the body, the pulse is small, contracted, frequent, and irregular. Finally, the spasm is so violent and so general, that it occupies even the venous system, and the blood does not flow from the veins when opened. All the evacuations are suppressed by the effect of these passions, except those of the belly; for ordinarily, these are augmented, and fear almost always produces diarrhea; it frequently produces incurable nervous affections, as palsy, delirium, melancholy, aphonia, and epilepsy; it singularly disposes the body to receive the impression of contagious miasms.

Fear frequently produces sudden death. *Marcellus Donatus* relates, that a child fell dead in a field, from seeing in the morning, before it was fully light, two persons clothed in black at his side. There are many examples of this kind which prove how dangerous it is to frighten children by absurd stories of dreams and hobgoblins; the least inconvenience that results from them, is a destruction of the energy of the mind, and rendering persons pusillanimous for the remainder of life. *Zacutus*, the Portuguese, relates, that a child which was bathing in the sea, was so frightened by the fire of a cannon from a vessel, that he died in a quarter of an hour with an attack of epilepsy.

*Van der Wiel* has left an account of the parietal bones being separated by fear;\* and *Robert Boyle*

\* *Centur. i. Observ. 1.*

mentions a woman who was attacked with the palsy, from seeing her son drowned. Marc Aurele Severin says, after Schenkius, that the blood came from all the outlets of the system in a nun, who was frightened by seeing herself surrounded by hostile soldiers, who had drawn swords, and that she died in their presence.

We must not confound terror with fear; the latter appears to act by considerably diminishing the vital energies; the former, on the contrary, augments them; and occasions stronger and more violent motions. The dumb have been seen to acquire the use of speech, paralytic persons the use of their members. and those afflicted with fever, obstinate paroxysms of delirium, epilepsy, and convulsions, cured by the effect of terror.

Van Helmont relates that many cases of hydrophobia have been cured, by suddenly plunging the patient in cold water, so as to create surprise. We have many examples of mania cured by this means. Salmuth says,\* that a gouty patient having his feet covered with cataplasms of turnips, was so frightened by a hog, which entered his chamber, and began to eat the cataplasms, that he began to jump and run, and that his pains immediately ceased. At the siege of Sienne, in 1555, a bullet which passed very near *marquis de Morignac*, frightened him so much, that he was cured of the gout, with which he was tormented. Boerhaave excited this passion with the greatest success in the hospital of Harlem, to cure children of both sexes attacked with *imitative* (sympathetic) epi-

\* Centur. i. Observ. 48.



lepsy;\* he had brought among the children, a chafing dish, filled with burning coals, in which they had heated iron, and ordered these children, who should have epileptic fits, to be burnt; the fear of torment was such, that they opposed the access of the disease with all their energies, and were radically cured.

Gloomy misanthropes have made a crime of love, and have endeavored to alienate it from the hearts of men, whose sentiments are influenced by that pas-

\* The most of human actions depend upon the disposition, which persons have to imitate others. The cause of this natural tendency to imitation, is inexplorable. One yawns, vomits, laughs, &c. from seeing others do the same thing. Among women there is a sympathy to micturate, when one manifests that she has occasion to do it, others follow. We are gay, sad, silent, &c. according to the disposition of the person, with whom we associate. It appears that this mechanical tendency to imitate, is more developed among certain nations than others and is generally the greatest among children, women, and persons of a weak mind. It is not astonishing then, that they contract most easily the habit of motions, which they see operating among others.

We read in the Philosophical Transactions, that there was in Scotland an old man, who was very small, meagre, and weak, from his infancy, who imitated, even in despite of himself, every thing that he saw done; excellent pantomime, he imitated exactly all the gestures that were performed before him, with his head, eyes, lips, hands, arms, and feet; he would cover and uncover his head when he saw any one do it; if his hands were held while any one gesticulated before him, he made every effort to get them free. He was asked why he did so? He answered that he suffered in his heart and in his head. For this reason he appeared always in public with his eyes shut, and in societies, he was obliged to turn his back upon company.

Boerhaave relates, that there was near Leyden, a school-master, who was squint-eyed. The relations of the children who went to this school, soon perceived that their children acquired the same deformity.

Salmuth says, (Centur. iii. observ. 56,) that two lovers walking in the garden, the young woman was attacked with a violent bleeding from the nose; her lover was so frightened, that he had immediately a similar bleeding.

It is by this imitative faculty, that we frequently see a hysteric woman communicate her fits to those who are near.

Plutarch relates in his *Treatise on the Virtue of Women*, that at Milet, town of Caria, there was in the air so powerful an influence, that all the girls killed themselves without any cause. It appears that those who first killed themselves, served as examples to those who were afterwards victims to that epidemic.

sion. This doctrine, not less absurd than extravagant, tends to nothing less than the destruction of the human species; but nature is more powerful than these teachers; she commands all, every race of beings to propagate its species, and there are none but the apostles of annihilation, who merit to be annihilated.

*Love* is proper to youth. The period in which it begins to develope itself, is that in which the organs have acquired all their growth, at least when the commotion of the senses have not been premature; this passion, which the poets have deified, is the principle and soul of the physical world; its empire is that of nature; all animated beings are subject to its laws; it is the source of happiness, but frequently also that of the most cruel misery. Happy love embellishes not only life, and diffuses a serenity over its horizon, but it supports health, and multiplies existence. Moreover, it is its power which frequently performs the cure of many diseases, to which art can only oppose unsuccessful means.

The hope alone of possessing the object of our wishes, has sometimes performed similar prodigies. But unhappy love fills life with bitterness and regrets, and gives birth to cruel nervous affections, such as melancholy, hysterics, catalepsy, consumption, nymphomania, &c.

Love is composed of several different passions; desire, hope, pleasure, chagrin, jealousy, and sometimes despair, are the numerous retinue with which it is accompanied. It produces then upon the animal economy different effects, and in a greater or less degree, according as either of these passions predominate, or as it is counterbalanced by one or

several others. Love, not excessive is, as respects the body, useful and even necessary to youth, in as-much as the different passions which it excites occasion lively commotions and circulations in the epigastrium, and thence to the other organs, and the rapid succession of spasm and atony, which they occasion in the diaphragm, promotes the circulation of the tonic forces, which support the harmony of the functions and consequently health.

In general, happy love produces an expansion of the forces; it augments the vital energy, and renders the pulse strong, frequent and open. It is not the same when accompanied with fear or jealousy; these passions produce a spasmodic contraction in the epigastrium, diffuse a kind of painful sensation throughout the organs, and render the pulse irregular. It was by the pulse that Hippocrates discovered the love of Perdica for Phillas, and Eristratus the passion which Antiochus had conceived for his mother-in-law *Stratonica*.

Violent love, and that near to enjoyment, augments the action, the energies and the animal heat; it colors and inflames the visage; the eyes become shining; the respiration experiences slight interruptions; the heart palpitates, and the members are affected with tremors: but, immediately after the passion is satisfied, all the body falls into a kind of weariness, and all the motions soon resume their natural order, and acquire their natural state. Violent love is but little susceptible of being repressed or of giving way to reason; incessantly occupied with the object of one's desires and the fear of losing her, it gives birth to all

the phenomena which strong and insidious contentions of the mind united to fear produce.

Violent love sometimes causes death. A soldier who was in love with a young woman, had made an assignation with her at night. As she was late in coming he hastened to meet her; at the moment he perceived her, he ran to her, and embracing her in transport, he gave a cry of pain and expired.\* We know the adventure of the young man, who had contracted a violent passion for *Mademoiselle Gaussin*, he went one day threw himself at her feet, and there expired in love, pleasure, and fury. Borsinius† relates that a *Demoiselle de Sieene*, called the Venus, by excellence, died suddenly at the death of *Comt Curial*, her lover. Love made such an impression on a young man who was sitting at the table near an amiable young widow, that the blood gushed forth with impetuosity from one of the veins of the forehead.

*Friendship* is a mild sentiment, which differs entirely from love, inasmuch as the latter is always guided by the material appetite of the senses, whilst the other is a union which exists, independently of the senses, between too sensible and virtuous persons. Friendship has also its martyrs, at the siege of *La Chapelle*, a Spaniard died in embracing the dead body of his friend. Horace survived the loss of *Mecene* but nine days.

As love is the source of the physical, so is *ambition* that of the moral world. But there is this difference between these two passions, love has for its

\*Ephemerides d'Allemangne, deed. 3 ann. 9. p. 293.

†. History of Hong, book 3d. p. 3.



object physical enjoyments, and ambition aspires to an imaginary happiness. The first is extinguished or languishes by enjoyment, and the other is nourished by it; ambitious desires irritate in proportion as they are satisfied, and it always sees beyond the pleasures which it tastes; it is this which prevents them from being enjoyed. Ambition lives in the heart of man, and is there modified into a thousand different forms, according to the character and the circumstances in which chance has placed it. It is composed of several other passions, and produces in the animal economy, different actions, according to the divers affections with which it is united. The ambitious soul, always fixed upon events, floats incessantly between fear and hope, and causes the body not only to experience the effects of the predominant passion, but also those of strong and continued contentions. When ambition is excessive, and when success is not commensurate with the expectation, chagrin and envy frequently occasion fatal despair, or undermine and slowly consume the system.

Of all the affections which accompanies ambition, there is none more dreadful than envy; it has been seen sometimes to occasion death, at the moment when the ambitious person met the object of his passion. Tissot relates the history of a Swiss magistrate, who fell dead at the feet of his fortunate competitor, at the moment when he approached him to felicitate him for having been successful in gaining a popular election in which they were candidates. We know the many evils that this passion, which is itself composed of desire, grief, and hatred, occasions in infancy. We frequently see children afflicted with obstructions, slow

fevers, consumption, convulsions, and other not less dangerous diseases, owing to the parents or teachers, frequently and unjustly, manifesting less friendship for and caressing them less than others.

We may refer to ambition the distracted love of riches, and the passion for gaming. The love of riches is not in itself a criminal passion, since riches are instruments of our wants and our pleasures. But it wounds social order, and becomes a crime when carried to excess, it causes us to employ improper and illegitimate means to enrich ourselves, when it degenerates into avarice, it is a kind of monster which cruelly torments its victims in order to render all who surround it unhappy.

The passion of gaming, flows from the thirst of riches and idleness. It is as injurious to society as it is prejudicial to health. It deprives the first of a portion of labor, industry, or talents, which each individual owes it; and it gives place to all the evils which depend upon a sedentary life, the excessive contention of the mind, and of the passions which are inseparable from it. It frequently corrupts the heart to such a degree, as to make it commit injustice; and, as *madame Houliers* has very well said.

“The love of gain impels us day and night,  
For pomp and wealth we strive with all our might,  
But as the storm on quick-sands throws the bark,  
So fail our projects and we miss the mark.”

Although ambition produces these fatal effects, it is not, however, in itself worse than love, when it is kept within just bounds, for nature commands us to aggrandise our well being, as well as to multiply our

species. 'This passion directed towards a good end, merits the greatest praise; it creates the learned, artists, and heroes, whose efforts, animated by the love of glory, tends to the general good, and does honor to the country which gives birth to them.

'The desire of being remembered by posterity, for doing good to mankind, is the most noble and most honorable ambition; next to this is the ambition of literary glory. These two *passions enlarge the soul*, and cause persons to attempt the greatest and most difficult undertakings, as the most useful to mankind.

We have seen what are the dangers that result from the abuse of the passions; it is not so easy to prevent them. A wise education is the only bulwark which can oppose them, and it is frequently insufficient. We should accustom ourselves early to confine them within just bounds, for how little soever they may be suffered to reign, they become cruel tyrants, which destroy the health of their victims, and torment them unmercifully.

It is not in our power to prevent the sudden excesses of joy and grief, which occasion discord in the motions of the system, and sometimes death. However, by accustoming ourselves to view with a degree of indifference, the events of life, we may become less sensibly affected by those that are extraordinary and unexpected; this is the most certain means of diminishing that great excess to which we give ourselves up in the first moments of a passion.

Persons born with a temperament disposed to pleasure, should interdict themselves the use of succulent and heating aliments, as well as that of wine and

strong liquors, *sine cerere et Baccho friget Venus*. It is not proper that they remain too long in bed, especially when they do not sleep. They ought to avoid libertine conversations and thoughts, lascivious paintings, and obscene books, but especially persons with whom they have had a tender connexion; they ought not to remain idle, and it is even indispensable that they should use fatiguing exercise, for the source of love is idleness. Theophrastus was asked what love was? he replied it was a disease of an idle mind. This is what has induced Ovid to say:

*Otia si tollas, periëre cupidinis arcus,  
Despectæque jacent et sine luce faces.\**

The philosopher of Geneva has justly observed, that labor is the antidote of this passion, and, in fact, when the arms are exercised, the imagination is still; and when the body is much fatigued, the heart does not warm it. This is the reason why hunting is advised to expel love; Diana is drawn as its enemy, and the allegory is very just.

It is much more difficult to avoid the passions of grief and hatred; but the dangers to which they expose one may be diminished by a mild and cooling regimen, and as digestion is not properly performed in these circumstances, it is necessary to eat but a very small quantity, to take exercise, to recall the energies to the circumference, and to endeavor to divert one's self with agreeable society, public shows, amusing authors, and travelling, which possess the triple advantage of procuring exercise, of having a change of

\* At busy hearts, in vain love's arrows fly,  
Dim, scorned, and impotent, his torches lie.—*Anon.*



air, and of diverting the mind; three powerful causes which produce the most advantageous changes.

The passion for gaming is difficult to suppress when we have contracted the habit; it frequently produces with the injury of health the loss of fortune. We should only play to procure a relaxation of the mind. The only means we have to employ to prevent the fatal effects of gaming, is totally to abandon it.

Fear is a passion of which it is not in our power to destroy the germ. It is proper to keep children, during the first education, from old women and domestics, who ordinarily tell them stories of dreams, phantoms, sorcerers, and an abundance of other absurdities; the impressions of which continue through life, depriving the soul of all its energy, and exposing the person to an infinitude of evils. All that we can recommend to inure us to, and diminish this disposition, is to shake off the yoke of prejudices, by reflecting maturely respecting the objects of our fears.

Ambition for riches and honors, requires too many cares and too much inquietude for a wise man to give himself up to them to excess; the flattering and most frequently vain hopes, which this passion instills in us are of no value, even when they are realized, the pains and dangers to which they subject us are not compensated. Its fruits are not a sufficient compensation for the baseness and infamy with which it most generally covers its votaries. A wise man, in the lap of abundance and at the summit of honors, is not so much occupied in ascending higher and amassing more, as in enjoying what he has, and in diffusing happiness around him; his happiness consists in bene-

ficence, and in the serenity of a pure soul, and he is worthy of long enjoying his delights. Happy is he who is persuaded that every excess in the passions is a vice, and in the pleasures a disease; enjoying the advantages and the pleasures of life, without seeking them with too much avidity; regulating, according to reason, the motions of nature; sacrificing the favors of fortune and honors to the pleasure of liberty, and living in the bosom of his family and of friendship: this is earthly happiness.

This question has been long agitated, to wit, which is the most advantageous to a man, to be sensible, or indifferent? Indifference renders him incapable of enjoying the pleasures of love and of friendship, it paralyses the heart, and closes the avenue to all the passions; sensibility, on the contrary, causes us to experience, powerfully, all those affections; it opens the soul to the sweetest impressions, and causes us to partake of the evils of our fellow beings. An insensible man knows no pleasures, and his frozen heart is a stranger to the pleasures of love. Without sentiment, as without desire, he is almost an automaton; the man, on the contrary whose soul is electrified by sensibility, finds his felicity in all that surrounds him; he interests himself in the fate of his fellow-beings; humanity is to him a second tie; and what delight does he not find in participating in the misfortunes and friendship of others? The man of sensibility has a knowledge of life, and enjoys it deliciously, whilst he who has been refused this sentiment is born under a sinister planet. The latter has no knowledge of the pure enjoyments of the soul, his heart enveloped

in triple brass, rejects the sweetest impressions; he never sacrifices to pleasure, nor to benevolence, and his life is but a long sleep.

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## CHAPTER V.

*On the labors of the mind, and the regimen of studious men.*

STUDIES are to the mind, what exercise and labor are to the body; they are useful to life, when they are moderate; they produce the same effects as the passions, and support the free circulation of the energies. The pleasure which accompanies the exercise of thought and sentiment, is diffused in some degree over all the organs, and contributes, not a little to maintain a just equilibrium of action in the different seats of sensibility, and the harmony of the functions which result from health. It is not rare even to see men who dedicate a part of their time to study, who, as well as those who live a very active life, are soon afflicted with serious diseases, when they interrupt or give up the labors of which they have contracted a habit. The exercise of the mind, continued within just bounds, does not shorten life, as some pretenders to science have asserted, who are enemies to the pen; and we see the greater number of learned men, arrive to a very great age. Homer, Parmenides, Hippocrates, Plato, Pythagoras, Plutarch, died at very advanced ages: Solon, Thales and Pittacus, three sages of Greece, lived each of them to an hundred

years: Zeno lived to ninety-eight, Democritus, an hundred and four; Cornaro at Venice, and Fontenelle at Paris, have augmented the number of centuaries. Who does not know that Galelus, Boyle, Locke, Leibnitz, Newton, Boerhaave, and in our day Voltaire, Buffon, &c. &c. have lived near a century? We should be tempted to suppose that physicians, who furnish to others the means of prolonging life, and preserving health, would occupy a distinguished rank among those who arrive at an advanced age; but experience proves the contrary; it is especially those to whom these words are applicable: *aliis inserviendo consumuntur, aliis medendo moriuntur*.\*

Excessive labors of the mind are very injurious, and soon destroy the strongest constitution. Besides the bad effects which a sedentary life, to which they are subjected, give rise; they are also injurious from too close an application, which causes a number of nervous affections, rarely curable. It is necessary to relax the mind as well as the body. Man is no more constituted to bear a continual application of the mind, than a perpetual action of the body; he would be as soon destroyed by the one as the other.†

It is the brain which is principally affected by strong and constant mental application, The most exalted geniuses have been seen soon to become obscure and deranged, owing to their not using study in moderation. Tissot relates the example of some children born with great strength of mind, whom fool-

\* They are worn away in serving others, and while they are giving life to them they lose their own.—*Tr*.

† *Morbus est etiam aliquis per sapientiam mori.*—*Plin*.



ish teachers forced to immoderate studies, and who contracted, in consequence thereof, epilepsy for the remainder of life. Van Swieten mentions having observed the same effect from a simple cause. Hoffman speaks of a young man, who always experienced epileptic fits, when he applied himself more than ordinarily to study.\* Petrarch also paid as dearly for his great application to study. Pascal saw incessantly at his feet a flaming gulph. Jurieu, celebrated for his theological disputes, and for a commentary on the apocalypse, was frequently tormented with the cholic, which he attributed to seven horsemen, who were contending in his entrails. There are a multitude of facts, that prove how dangerous it is to dedicate one's self with excess, and without care and regulation, to the culture of the sciences. I do not even doubt, but the nervous affections, so common in our days, depend, in a great measure, upon that kind of fury, which young persons have for reading the Roman authors, which not only corrupt the heart and dispose to the passions, but also throw the nervous system into an extreme mobility, from which results a disorder and irregularity in the motions, sources of an infinite number of diseases.

The epigastric region concurs powerfully to the labors of the mind, and especially the diaphragm, stomach, and flexure of the colon. It is in these parts, that the energies are reflected, where they fix and concentrate during profound meditations, as well as during great corporeal efforts. In these circumstances, the lungs seem to be forced upwards; this is the rea-

\* I have seen one case of epilepsy, which, I believe, was produced by close mental application.—*Tr.*

son respiration becomes slower; sometimes it is suspended and accompanied with sighs. We experience in this region a contraction similar to that which disagreeable affections or passions occasion. We thence easily conceive, that immoderate labors of the mind must affect the digestive powers, and dispose to melancholy, which is owing to the habit that the humors and energies have contracted, of being constantly directed to the epigastrium, and there forming embarrassments.

The mechanism of the intellectual operations is most strictly dependent on the action of the epigastrium; the brain cannot act without it. The tension of the diaphragm, stomach, great curvature of the colon, and almost all the epigastric organs, are necessary to meditation. These organs are, in some degree, the excitants of the brain; it is these which electrify it, and which give rise to thought; but if their constant action promotes the shoots of genius, they are very prejudicial to health, and abridge the duration of life. "When we take notice," says Robert,\* "of a man strongly engaged in his pursuit or with his object, he seems to have become insensible; nothing exterior can claim his attention; if one speaks to him, he does not hear; if one touches him, he does not feel; he does not even perceive the objects that are before his eyes. The organs of these divers senses seem to be deprived of action. Why then that singularity of affection? Is it not owing to the action being divided between the phrenic centre and brain? Or rather, is it not owing to the whole effort being concen-

\* *Traite de Medecine*, tom. ii. p. 51.

trated to the interior; when, a new determination of the current of humors take place; they concentrate more in the belly, and occasion melancholy, when the labor is long and frequently repeated.”

We see, in fact, that when this direction of the oscillations is habitual and constant, there should result from it an increase of action in the epigastric organs, and a diminution of it in the others; and the energies being so unequally divided, there is a cessation of harmony in the motions; the functions, especially those of the abdominal viscera, are impaired, which is the cause of a multitude of diseases, that are developed, especially in the age of virility, because this is the period of life, in which the energies, that were expansive in youth, take a contrary direction, and converge towards the interior.

Young persons are less exposed to the dangers which take place in consequence of excessive studies, than others, because, as I have already observed, in speaking of the passions of this age, the motions and the actions are naturally directed towards the exterior organ, and the epigastrium is less disposed to retain them. However, this age is not entirely exempt from the fatal consequences produced by immoderate studies, or those prolonged in the night. The somnambulus of a medical student, related by Bohn,\* a complete catalepsy took place in another, according to the relation of Ferrel,† are an unequivocal proof of it, as well as an observation of Wepfler,‡ relative to a young man, aged twenty-two years, who, from laborious

\* Haller, Thes. Med. Pract. tom. vii. p. 439.

† Pathol. l. 5 ch. 2.

‡ Obs. de Affect. cap. obs. 85.

study, contracted a mania so violent, that he wounded several persons, and killed his guard.

Although the effects of the passions differ but little from those produced by the immoderate labor of the mind; the action of the latter is, however, less violent on the phrenic centre, but more so on the brain; whence it happens, that great mental application produce rather affections of the brain, and the passions, which have their origin immediately in the entrails, such as nervous fevers, melancholy, *cum materie*, &c. The epigastrium in immoderate and continued studies, reflects the spasm with which it is struck to the brain, and disturbs the organization of this organ. It is very common to see headache, deafness, blindness, apoplexy, palsy, but especially imbecility, &c. be the sad fate of learned men, and those of genius, who have the most illustrated their age. They are punished, says Tissot, by the part which has offended. The brain too long in a state of commotion, loses, finally, its healthy faculty; it contracts and becomes incapable of the necessary extension, not only for new conceptions, but also to retrace the acquired ideas; hence we most ordinarily see the memory fail first, and soon afterwards the energies of the mind remain entirely deprived of their spring and action.

It is then very dangerous to apply one's self immoderately to study; and it is absolutely necessary for studious persons, in order to enjoy health, to relax their mind by cheerful recreations, and to forget the affairs of the study; to enjoy the open air, and to take exercise proportionate to their energies, and to observe a regimen analagous to their labors; amusements, public shows, music, society, and especially the company



of cheerful and jovial persons, for whom a kind of contempt frequently induces them to avoid their company, have been justly recommended for their diseases; in a word, every thing which procure the fatigued mind agreeable diversions, and restore the energies, is proper in these cases. The exercise of the body in the open air is absolutely indispensable to studious men, to restore to the exterior organs the energies, which their studies have concentrated in the epigastrium, and thus to promote the circulation of them. Walking, riding on horseback, plays which put in action all the members, and the culture of the ground, are of the greatest utility to them; the last, especially, which has the advantage of exercising, not only every part of the system, but also of communicating the sweet and enlivening aroma of the plants. Voyages or airing on water, are excellent means of preventing and dissipating obstructions of the abdominal viscera, of diluting the bile, re-establishing the perspiration, and in general of promoting all the excretions. Studious men, who have it in their power to procure this advantageous exercise, should not neglect it; the ancients were convinced of its utility. The emperor Augustus, who was himself a studious man, and subject to all the inconveniences of this state, preferred this exercise to all others.\* Swimming procures the same advantages.

The mechanical philosophers have pretended that the labors of the mind, as those of the body, exhaust the animal spirits, and that to this cause is to be attributed the languor of the organs and the debility that they experience in all the members; this er-

\* Si quo mari pervenire posset, potius navigabat.—*Suetone*.

ror, as has been very well observed by De Seze, is so much the more dangerous, as it keeps one from having access to the most efficacious means of preventing or relieving the diseases that excessive mental application occasions, means which consist in the exercises of the body. If, in fact, these spirits are exhausted, exercise ought necessarily to be injurious, since it would augment the debility by evaporating a greater quantity of the spirits. But a multitude of observations prove the contrary, I will relate that of a young man, aged thirty years, of whom Robert speaks.

“This man, full of sagacity and endowed with wisdom, has had, through infancy and youth, to contend with the greatest misfortunes. Since the age of twenty years his temperament has become stronger, and his health, although delicate, is much better. This man is very fond of labor; sometimes he gives up to it with too much ardor and perseverance. The consequences of these excesses are a trembling in all the members, and an extreme weakness, which, in fact, do not continue long. Long and forced walking succeed better than any other means to relieve him from this state of annihilation; though they are made immediately after his labor, he is not the less certain to recover all his energies.”

This observation is sufficient to prove that the effect of the labor of the mind is not the cause of a real exhaustion, but rather of the directing of all the action towards the same focus, which retains instead of reflecting it; that it deprives the other parts of the system of them, and thus produces a debility not of ex-

haustion, but of concentration, which exercise dissipates.

The regimen of men of letters ought to be analogous to their energies, and we do not see the necessity for their abstaining from any species of healthy aliments, provided they use them moderately. It is only necessary that they avoid those of difficult digestion; and especially those that are fat, viscous, fried, paste, flatulent legumes, hard, smoked and salted meats, &c. These aliments are improper for the most of studious men, in whom the vital action, concentrated in the epigastrium, soon degenerates into a strong spasm, how little soever they use aliments of a difficult digestion; as for those even who are stronger, and whose digestive faculties have more energy, it is also prudent that they should abstain from the use of them.

Studious men have been recommended to make water their only drink; this severe advice is proved to be wrong by the example of medical men of learning who have given it, it may be correct in some particular cases. Experience, besides, proves the contrary. If the example of Demosthenus, Locke, Haller, &c. who never drank wine, should be cited, a great number of learned men and artists, who have used it without inconvenience, may be also adduced; it is those only who have not used it within the bounds that reason and the desire of preserving themselves prescribes, to whom this drink has been prejudicial. In general an abstemious life is only proper for those who have contracted the use of it in early age. Wine is the best of tonics and cordials: it is proper then, for studious men, whose energies require to be repaired,

and the mind to be animated. It aids the labor of digestion; and, without doubt, is better than rhubarb, aloes, and other similar drugs of the apothecary; which, by one of the most whimsical contradictions, have been advised to studious men, as tonics and fortifying articles.

What I have just said of wine, should be applied to coffee, which taken moderately and not habitually, must be advantageous to studious men; it is only those who have nerves of an extreme mobility, or those in whom it produces insomnolency, tremors, &c. or other nervous symptoms, who should be absolutely interdicted from the use of it. The example of Fontenelle, the immortal Voltaire, and other great men who were passionately fond of this stimulating drink, and who, nevertheless, arrived to a great age, completely refutes all the vain arguments of these doctors, who, from their closets, dictate lessons to the human species, which can scarcely be followed, and which they themselves do not put in practice. There are besides, studious men, to whom the use of coffee is indispensable.

A more salutary advice to studious men, is that of not applying themselves to study immediately after eating, because the energies are then divided between the brain and stomach, and there is not enough in either to fulfil their functions; study in these cases becomes laborious and unfruitful, and the digestion is disordered. It is necessary, to labor usefully and to preserve one's health, not to engage in it until an hour or more after eating.

It is scarcely possible to prescribe the most proper hours to study; that depends much upon the disposition



in which we find ourselves, and the practice we have contracted. There is but one rule to follow on this score, which is to dedicate ourselves to study when it is pleasant, and to avoid it when the conception is not easy and the ideas clear.

There are persons who labor better after mid-day or in the night, than at any other time. But generally, the labor of the morning is the most profitable; and, as has been very well observed by the poets, aurora is the friend of the muses; besides, we are then less distracted, owing to the ideas being more happy, and the imagination more lively, especially when the supper of the preceding evening has been light, and taken early.

It is also useful for studious men to establish their studies in the highest part of the house; that it be large, well lighted, airy, and as much as possible, exposed to the east, (west) and rather in the country than cities. The choice of good air is of the greatest importance; it has as great an influence on the mind as body. "A healthy air," says Hippocrates, "animates the mind, and a thick one renders it dull."

Bæotum in crasso jurares aëre natum.\*

To succeed well in studies, it is also necessary to have a temperate air, which is neither too warm nor too cold. Dodart\* speaks of a young man, of a precoc mind, who entirely lost his memory during the canicular days, and who recovered it as soon as the air was a little cooled; and Zancisi, the physician of pope Innocent XI. and Clement XII. wrote to *Cocchi*, that during

\* You'd swear in dull Bæotia he was born.—*Tr.*

† Hist. de l'Acad. roy. des. sc. 1705; p. 72.

the excessive heat of summer he was incapable of meditating and writing.

Studious men should rarely partake in the pleasures of love, which are not only prejudicial to their health, but which weaken the energy of their brain, necessary to the production of thought. Minerva rarely frequented the garden of Idalia.

They ought to sleep at least seven or eight hours in the twenty-four, and not to prolong their labors too much after night. This practice increases the tension and the spasm of the epigastric organs, which finally renders it almost impossible to sleep, and which occasions an irregularity in the motions; it occasions disorder in the functions, and augments the causes of the diseases attached to the excessive fondness for study.

Pervigiles meditabundus ne ducito noctes;  
Ordo placet musis et amant alterna Camœnæ.  
Si delectari somno viresque lucrari,  
Inde cupis, serà meditari desine nocte\*

*Carm. de hom sano et ægroto.*

\* In meditation pass not sleepless nights;  
In method and in ease the mind delights,  
Sound and sweet sleep the wearied mind befriends;  
Wisdom will teach, "with day the study ends."

## APPENDIX.

### ARTICLE I.

#### ON EDUCATION.

'Tis granted and no plainer truth appears,  
Our most important are our earliest years;  
The mind, impressible and soft, with ease  
Imbibes and copies what she hears and sees,  
And through life's labyrinth holds fast the clue,  
That education gives her, false or true.

COWPER.

**T**OURTELLE, in his chapter on education, has confined himself principally to physical education, or to the nursing of children. By recurring to history, we shall discover that education, not only as regards the body, but also the mind, has had the greatest influence on the manners, health, and prosperity of the inhabitants of the different countries of the world, from the most remote antiquity. And we shall also discover from the effects of certain causes, what a knowledge of man and reflection should teach us; that there is the closest connexion between the mind and body, and that they mutually influence each other in the most powerful manner. "The first inhabitants of Greece were persuaded, that the soul acquires energy

in proportion as the body gains vigor or strength; hence, the codes of their morals were formed according to the physical wants of man; the first generation furnished *athletia*, and that which succeeded produced great men."

The Romans, who imitated the Greeks in many respects, formed a *gymnastia*, where the youth exercised themselves. The prosperity and grandeur of this nation while its inhabitants continued virtuous, temperate, and industrious, and its decline, when effeminacy and luxury were introduced among them, is too well known to need a further notice.

Although many valuable works have been written on the subject of education, and much useful information has been communicated through them to the public; yet, we are induced to believe much additional information, and that of a general advantage, might be given on this subject. And as the welfare of the individual depends on a proper education, and that of society and the world at large, on the proper conduct of each individual, we know no subject more interesting, and which has a greater claim on the well informed and virtuous part of the community. Although we propose to endeavor to fill a void, which we conceive there is in the work before us; yet we cannot enter into a general discourse on education; and to avoid being inadvertently led by this subject, which so closely interests our best feelings, beyond the limits necessarily prescribed to this article, we shall give as little original matter, as we can consistently with our duty.

Tourtelle has spoken against the impropriety of applying children to studies at too early a period of life. Let us now see what a celebrated German author says



on the same subject: "The powers of the mind must not be exerted too early. It is a great prejudice that people imagine they cannot make a child begin to learn too soon. But it is certain that a child may begin too soon, when that period is chosen during which nature is still employed in forming the bodily powers and organs, and has need of all their strength for that purpose. This period extends to the seventh year; and if a child be obliged at an earlier age, to apply to learning, and be confined in a sitting posture, its body will be deprived of the noblest part of its powers, which must be now wasted by the business of thinking; and the consequences will be, a checking of the growth, imperfect formation of the limbs, muscular weakness, bad digestion, corrupt juices, the scrophula, and a preponderance of the nervous system in the whole machine, which will become burthensome during life by nervous affections, the hypochondriasis and evils of like kind. Much, however, will here depend on the difference of constitution, and the greater or less vigor of the mind; but I earnestly request that parents and others, will in this respect, pursue a method directly contrary to that usually followed.

"If a child shews an early disposition for thinking and learning, one ought, instead of straining its powers the more, as is commonly the case, to prevent it from a close application until a later period; for such premature ripeness is disease, at any rate an unnatural state, which ought rather to be checked than promoted, unless one wishes to breed up a *monster of erudition*, rather than a sound and healthy man.

"I must here remark, that a great many of the evils which attend too early study, may not arise so much

from exerting the powers of the mind, as from confinement and settling, and from the corrupted air of schools in which children are taught. At any rate, the weakness is doubled. I am fully persuaded, that it would be much less injurious if children were made to perform their school business in the open air during the fine seasons; and here at the same time, would they have before them the book of nature, which supposing that the pupils are capable of reading and understanding it, is much more fit and proper for their instruction than all the books that ever were written or printed."

From much reflection on this subject, I have long been of the opinion, that country situations are the most proper for schools. If schools were well regulated in healthy country situations, and the masters were moral good men, the children would learn more, they would enjoy better health, and their hearing and sight would be much better than these senses are in towns or large cities. The reader is requested to recur to what Tourtelle says respecting these senses. As regards the morals, the advantages that a country situation possesses over the city must be obvious. It is true they might have less of the polish of dissipation, which many unfortunate parents attribute to a superior degree of intellect; and which, although gratifying at first, finally costs many a tender sigh and solicitous fear, not without reason, considering how many promising young people become a prey to the seducing snares of dissipation, and are buried in an untimely grave, or drag out a miserable life under the heavy burden of diseases thus contracted. How much might the peace of families and the prosperity and

welfare of individuals be promoted by a proper education! and how many of the snares that entangle the unsuspecting youth, might be avoided by a country education!\*

But should a country school be preferred, it is necessary that the house should be large and airy, and in a healthy situation, that too many children be not crowded in one apartment during the day, but more especially at night; that their chambers be large, clean, and well ventilated; and that every attention be paid to cleanliness and proper exercise. Here I will take the liberty of suggesting an idea which I consider of material importance. I have been induced to believe, that much advantage would be derived from instructing children in manual labor while at school. And although there may be those who could not bear the idea of their children working, but had rather see them raised in the lap of indolence in a city, and set the midnight riot in a blaze; yet, I think the majority of parents, on due reflection, will acknowledge the advantage of such a regulation as I will briefly suggest. In recommending manual exercise, I do not propose it as a task, but as an agreeable amusement. If the school was established in a country situation, a large well regulated garden might be kept, in which the preceptors and their pupils might work a few hours occasionally, when the weather was fine, without intruding on school hours or those of play, and an exercise of this kind might be conducted so as to be both amusing and salutary. The usual custom of

\* "It appears that a rural life naturally inspires sentiments of benevolence; by continually receiving the gifts of nature, the mind is enlarged, and men are insensibly accustomed to diffuse them to those around them."

keeping children four or five hours over their books without intermission, to say nothing of its pernicious effects as regards the health, is at best, but a sacrifice of time. For even after the system has acquired its complete growth, and the energies are more concentrated in the organs immediately interested in mental labors; who is there that can apply himself in these pursuits this length of time with advantage? Who is it that would not be exhausted with two hour's close application? If this is the case in mature age, and that it is, all studious men must allow, it must be much more so in early age, before the solids have acquired a sufficient tone to support it, and when the energies are divided more among organs concerned in the expansion and growth of the general system. And, as Tourtelle has correctly observed, when the energies are concentrated in too great a proportion in the epigastrium and brain for mental labor, a disease of the body, &c. is the consequence.

Manual labor when not carried to excess, gives tone to the general system, and renders the individual healthy; and I have no doubt, but a child thus educated, would learn more in two hours, than one educated in the ordinary way does in a day. And should any case of emergency require muscular strength, he has it; he is not so much affected by one or two hour's extraordinary exercise, as to be incapacitated for any business, or seriously indisposed, which is frequently the case with those *hot bed plants*, raised and educated in cities.

If he is in opulent circumstances, a little pleasant exercise, of this kind, will neither injure nor disgrace him; but he will learn more, he will enjoy better



health, and have more energy of both mind and body. It can disgrace no one, the time has been, as history informs us, when the first men of the world, kings, emperors, &c. dedicated themselves habitually to corporeal labor; and a majority of the greatest men, that the world has ever produced, have been brought up to manual labor and rusticity. They have been fruit bearing branches that have germinated from obscure roots. Should the person thus educated, be only in tolerable circumstances, designed for public business of any kind, and should he after undertaking this, be unfortunate and compelled, finally, to obtain his bread by the sweat of his brow, he is, in some degree, prepared for the event; and the vicissitudes of fortune are not unlike those of the weather. To-day the sky may be serene, the air pure; the solar rays may enliven all nature, the grass may grow, the trees bud, and the flowers bloom; but to-morrow the sky may be surcharged with thick clouds, the sun obscured, the air contaminated with pestilential vapors, the grass may wither, the buds be destroyed and the flowers fall! So it is with fortune, he who is to-day rolling in his chariot, arrayed in all the pomp and grandeur of this world, attended by servants who obey his very nod, may, before the revolving of another sun, be reduced to indigence! By educating a child in this manner, it is not intended to make him a mere hewer of wood and drawer of water! It is a plan which philosophy dictates, and all her plans are wise and salutary. It is agreeable to the laws of nature, who causes the body and mind to expand and grow at the same time; and who has so constituted the sys-

tem, that one cannot be materially affected without affecting the other.

I will here introduce an extract from a manuscript letter, supposed to be addressed to a young friend, by G. W.

“The mind is a part of that dignified being, man! With which you are not yet very well acquainted; nor are the most acute metaphysicians, as well versant with it as they suppose. However, those who have laboriously studied it, know more respecting it, than it is to be supposed one of your age can. It has been discovered, that the mind, like the body, is more energetic in the prime of life, than when old age approaches. It is some time before the body arrives at its acme, and when it does, we find that the person who has been inured to labor, has generally more energy and strength of muscle, than one who has not. When the body arrives at its complete acme, I believe it does not long remain in this state, but soon begins to decline, and continues gradually to wear away, unless disease should step in and cut short the thread of life, until the person glides gradually into eternity. When a person dies with old age, before his dissolution he generally experiences what is termed the second child-hood—‘once a man, twice a child.’ Where two persons enjoy equally good health, the one who is accustomed to *hard* labour, declines sooner than he who does not; this can be satisfactorily explained on physiological principles. For fear this language might induce some to be drones in society, be it remembered, that the Deity, in his wisdom, has constituted man so, as to render labor or exercise necessary to health.

“We will now proceed with the mind; and I entreat you to mark the great analogy between the body and mind, as it will enable you the better to comprehend a concluding inference.

“When we are born, the mind may be compared to a piece of virgin wax, somewhat elastic, but which is without any impression. Our senses are as conduits to the mind. All the impressions made on the senses are conveyed to the mind; some of which are there so firmly fixed as to remain for ever, while others are of a short continuance: like the jar of an elastic substance, they claim our attention for the moment, but are soon forgotten. In about twelve months, those impressions that have remained, have generated enough of what are called ideas to excite the tongue into operation, in a manner very different from that in which it has hitherto been employed; and we are now enabled to express our ideas. After we have acquired the faculty of speech, we are more subject to common education; as soon as we can express our ideas, we can communicate with our fellow beings; by this means we profit much, for those who possess intelligent minds, cannot only explain the nature of the things that are daily presented to our senses, but also communicate the information which they possess. Thus from our birth our mind begins to grow, and the more it is expanded, the more stimulus it is enabled to receive; and the more stimulus it receives, the more it generally expands, until it arrives at its acme; and also sooner declines.\* Certain nourishment is necessary for the support of the body, so is sustenance

\* Here the observation respecting second childhood, is perhaps more applicable, than it is as regards the body.

necessary for the support of the mind. If the food we eat is not conducive to health, the system becomes morbidly affected; if it is not sufficiently nourishing, the body grows meagre and debilitated; if it is too rich or strong, it produces indigestion, and its dreadful train of diseases. So it is with the mind, if it is confined to trifling subjects, its ideas partake of their nature; and if it is presented with those too majestic for its comprehension, they excite incoherent ideas, &c. hence the necessity of paying strict attention to education.

‘Tis education forms the tender mind,  
As the twig is bent, the tree’s inclined.’

“In addition to this great analogy existing between the mind and body, there is also a very close connexion between them, each mutually affecting the other. When the body is diseased, it very materially affects the mind, and *vice versa*.” (The inference alluded to, now follows, but it is not immediately connected with this subject.)

I will conclude this interesting subject, with two articles from the civil laws of China, whose wholesome principles would do honor to any country.

ARTICLE VI. Let the public schools be carefully maintained, and above all, let youth be instructed early in the duties of life and formed to good morals.

ARTICLE XVI. Restrain every sudden emotion of passion, and you will avoid many dangers.



## ARTICLE II.

*Onanism.*

TOURTELLE has made but few remarks on onanism, or as he modestly terms it, solitary pleasures. As this is a subject of great importance, I deem it expedient to enlarge on it in this place. Both Tourtelle and Hufeland, two of the most ingenious popular authors that have ever written on medical subjects, have treated this subject as closely connected with that of an excess in venereal enjoyments, but have supposed onanism the most pernicious to mankind. Legitimate and moderate venereal gratifications are acknowledged on all hands, to be conducive to health; but when indulged in to excess, to enervate both body and mind, and to produce disease, or bring on premature old age and death.

Onanism is a vice which is not peculiar to either sex, but common to both, and has perhaps, more votaries, than that of any other vice, in which mankind indulge; and it is certainly one of the deepest die. Parents and those to whom the education of children are confided, cannot be too careful in guarding their sacred charge against this abominable practice; and, indeed, it is a vice of that private and secluded nature, which must frequently remain undetected, even by the greatest vigilance. But, as vicious habits when contracted, and even when detected, are frequently difficult to cure, and sometimes even incurable, every effort should be made to prevent their origin. This

is peculiarly the case as respects onanism. Every step should, therefore, be taken to prevent this destructive evil, and the first step to be taken, is to endeavor to discover what leads to it. Among the most prominent causes of this vice, are an indolent life, indulgence in heating diet and drinks, obscene conversation, reading of novels filled with love tales; parents, &c. animadverting in an improper manner, in the presence of their children, on the misfortunes of their neighbors, relative to this vice, or that of seduction, &c.; mothers teaching their children, at too early a period, that their grand destination in this world, is that of wives; and a large number of children who have been infected by some one or more of these causes, being left to themselves, to relate the obscene stories, they have either heard or read. Hence, colleges and large boarding schools are frequently the hot-beds of this vice. Under each of these heads, much important advice might be given, but it would require a volume to do them justice; they are also of that delicate nature, as to forbid, even on this important occasion, a full and correct exposition. I will, therefore, after making a few remarks relative to one or two of them, leave the reader to supply this deficiency by his own judicious comments, and if he should only have an idea of half the evils attending the practice of onanism, I am sure he will profit by these *land marks*.

The practice of animadverting on the misfortunes of our neighbors, serves to pass away many an idle hour. I am not going to examine this practice farther, than as immediately related with my subject, and than as done with the purest design. A parent who

is solicitous for the welfare of his offspring, hears of some disastrous event, that has ruined the reputation of his neighbor; he and his wife converse on this subject in a familiar manner before their children, compassionating the unfortunate person, and occasionally giving their children a few words of advice, to guard against a like misfortune; the children hear and think they will profit by the advice, and no doubt would, if the subject was not again and again brought forward; but in consequence of its being so frequently renewed, they become familiarized to it; and no person who has made any observation in this life, need be told how easy it is to contract and become familiarized to vices of any kind, which they frequently hear spoken of, or see committed. It is therefore proper, when an unpleasant occurrence of this kind happens to one of our neighbors, and there is reason to fear our offspring will be injured by the example, to represent the consequences of it to them in the most serious and the most delicate manner, but never to renew the subject, so as to familiarize them to it.

Mothers teaching their daughters that their grand destination in this life is to be wives, has a very unpleasant effect, and yet it is a common practice that prevails from generation to generation. The duty of the mother is to bring them up, so as to enable them to fulfil this station properly, when they do become wives, and not to stimulate their desires before the proper period; but, if any thing, rather suppress a premature inclination of this kind, when manifested, which is very frequently the case.

There is a kind of privilege taken by old people, especially fathers, of expressing themselves in a loose and

immodest manner before their children, which cannot be too strongly censured. Many an amiable fair one has lost the index to virtue, the blush of modesty, from this unguarded conduct of their parents. In these remarks I have confined myself to those parts of my subject which have been generally unnoticed; but it may be remarked, in a general way, that every thing which has a tendency to excite the venereal desires in an unmarried person, either disposes to an illegitimate commerce of the sexes or to onanism. Those who are not afraid of the world's scorn, are frequently plunged into the lowest abyss of pollution by the former, and those who are have excess to the latter. Let us now see what are the consequences of the latter. On this occasion I shall make an extract from Hufeland on onanism, preceded by his concluding remarks on an excess in physical love. After pointing out what are the pernicious effects of an excess of venery, and an illicit intercourse of the sexes: he says, "It may, perhaps, be here asked, what is meant by an *excess* in physical love? My answer is, when either sex indulges that passion too early, before the body is completely formed—females before the age of eighteen, and males before that of twenty; when this enjoyment is too often and too violently repeated, which may be known by the following consequences: lassitude, dejection, and loss of appetite; when one by a frequent change of object and circumstances, or by the artificial stimulus of spices, heating liquors, and the like, excites new desires in the relaxed powers, or makes that exertion during the time of digestion; and, to include the whole in a few words, when one enjoys physical love without marriage; for it is only under



the matrimonial tie, which excludes the stimulus of variety, and directs the physical propensity to a higher moral object, that passion can be physically refined, that is to say, be rendered salutary and useful.

“Every thing that has been here said is applicable, in an eminent degree to *onanism* also; for that forced and unnatural vice increases, in an extraordinary manner, the straining of the organs, and the weakening connected with it; and this is a new proof of the principle I before laid down, that nature avenges nothing so dreadfully as transgressions against herself. When transgressions prove mortal, they are always crimes against nature. It is, indeed, highly worthy of remark, that a dissipation which seems to be so perfectly alike in all its parts, should, however, be so different in its consequences, according as it is confined to a natural or unnatural method; and as I am acquainted with judicious men who cannot be convinced of this difference, I shall embrace the present opportunity of shewing how *onanism*, in either sex, does infinitely more mischief than natural enjoyment—horrid is the impression stamped on nature by such an offender! He is like a faded rose, a tree blasted in its bloom, a wandering skeleton. All his fire and spirit are deadened by this detestable vice; and nothing remains but a debility, languor, livid paleness, a withered body, and a degraded soul. The eyes lose their lustre and strength, the pupils seem sunk; the features are distorted and lengthened; the rosy complexion of youth vanishes, and the visage appears of a pale white leaden color. The whole body becomes affected, and sensible of the slightest impression; the muscular power is lost; sleep brings with it no refreshment;

every moment is attended with torture; the legs can no longer support the body; the hands tremble; aching pains arise in all the limbs; the faculty of thought is deranged, and cheerfulness is banished. The unhappy sufferer speaks little, and as if it were only by force; and all his former liveliness of mind is depressed. A youth endowed by nature with genius and talents becomes dull or totally stupid; the mind loses all taste for virtuous and exalted ideas; and the imagination is altogether corrupted. The slightest circumstances respecting a female is capable of exciting in him desire, shame, horror, and repentance; and a despair of his evils being cured renders his misery complete. The whole life of such a man is a continued succession of secret reproach; painful sensations, arising from the consciousness of having brought upon himself internal weakness, irresolution, and disgust of life; and it needs excite no surprise that such an unhappy wretch should at length become a self-murderer; for no man is so much exposed to suicide as the onanist.

“The wasting of that which gives life, excites disgust of life in the highest degree, and that singular kind of self-murder, *par depit*, which is so peculiar to the present age. Besides, the powers of digestion are destroyed; the patient is tormented with flatulencies, and the cramp in the stomach; the blood becomes corrupted; the breast is choaked with phlegm; and eruptions and ulcers in the skin; a desiccation and wasting of the whole frame, epilepsy, asthma, slow fever, debility, and premature death, are at length the consequences.

“There is another species of this vice which may be called *moral onanism*. It is possible without bo-

dily pollution, but it exhausts in a dreadful manner also. I here allude to heating and filling the imagination with obscene and lascivious ideas, and a vicious and habitual propensity to indulge in such thoughts. This evil may, at length, become a real disease of the mind; the imagination is then totally corrupted, and governs the whole soul; nothing is interesting to men subject to it, but what relates to lewdness; the slightest impression of that kind excites in them a general fervor and irritation; their whole existence is a continual fever, which weakens the more, as it always stimulates without gratification. This state may be found, above all, among voluptuaries who have abandoned sexual enjoyment, but who endeavor by such mental indulgence, to make themselves amends, without reflecting that in its consequences it is almost equally destructive; also in religious celibacy, where mental onanism can assume the mass of fervid devotion, and conceal itself under the appearance of divine rapture and ecstasy; and lastly, among idle persons of the other sex, who, by novels and the like means, have corrupted their imaginations, and excited in them a propensity which is not unfrequently honored with the modish name of sensibility; and who, under a stiff and severe outside, indulge often in the lewdest and most dissolute ideas."





## GLOSSARY.

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### A.

*Acoustic.* Relative to hearing.

*Antiphlogistic.* Cooling and weakening.

*Aphonia.* Loss of voice.

*Acerb.* Acrid.

*Albumen.* White of an egg, and an animal substance resembling it.

*Allium.* Garlic, onions, &c.

*Analeptic.* Restorative and nervous.

*Angina.* An inflammatory affection of the throat.

*Animality.* Of an animal nature.

*Aroma.* Fragrant or odorous.

*Aura.* An airy exhalation.

### B.

*Bivalve.* Two shells.

*Bronchia.* The windpipe after dividing.

## C.

*Cachochymia*. Depraved state of the humors.

*Catalepsy*. A species of apoplexy.

*Cholera morbus*. A puking and purging with pain.

*Caruncle*. A protuberance of flesh.

*Cerealìa*. All sorts of corn with which bread is made.

*Convolvulus*. A species of root, such as gamboge; &c.

*Concocted*. Digested.

*Comatose*. A strong propensity to sleep.

*Concressible*. A capacity to unite or amalgamate.

*Cetacia*. Sea animal of the whale species.

*Crustacia*. Fish of the lobster species.

*Cutaneous*. Relative to the skin.

*Curcubita*. Gourd kind.

*Crucifera* or *Cruciform*. Plants with four petals regularly disposed in the form of a cross.

## D.

*Detergent*. A substance that cleanses.

*Diaphoretic*. Gently exciting perspiration.

*Diabetes*. A profuse discharge of urine.

*Dyspnea*. A difficulty of breathing.

## E.

*Emmenagogues*. Medicines that promote the menses.

*Emolient*. Softening.

*Engorgement*. Distention.

*Epidermis*. Outer coat of the skin.

*Epilepsy*. Fits or falling sickness.

*Equitation*. Riding on horseback.

*Expectorant*. Medicines that promote the discharge produced by coughing.

## F.

*Farinaceous.* Consisting of meal or flour.

*Fecula.* The dregs or coarser part of vegetable matter.

## G.

*Gallic acid.* Acid of galls.

*Gestation.* Pregnancy.

*Gramina.* Grain.

## H.

*Hydatides.* A collection of little transparent bladders of water forming a species of dropsy.

*Hæmorrhage.* Bleeding from any part.

*Hæmorrhoidal vessels.* Vessels subject to piles.

*Hepatic.* Relative to the liver or bile.

*Hypochondria.* Region of the side.

*Hypogastric.* The lower part of the belly.

## I.

*Insomnolency.* An inability to, or a disturbed sleep.

*Icosandria.* A class of plants which have twenty husbands.

## L.

*Lethargy.* A heavy, sleepy state.

*Lippitudo.* Blear eyed.

## M.

*Marasma.* A wasting away, becoming lean.

*Masticatory.* Articles which in chewing, excite a flow of saliva.

*Miscible.* A capacity to mix or incorporate.

## N.

*Narcotic.* Articles that produce sleep.

*Nidorous.* An offensive smell, unpleasant eructations or belching.

*Nymphomania.* An insatiable desire of women for venery.

## O.

*Oedema.* A white soft tumor.

*Œstrum.* An animal in heat.

*Orgeat.* Relating to barley, &c.

*Oxalic acid.* Acid of sorrel.

*Ovaria.* Eggs, part of female animals necessary to generation.

## P.

*Parietal bones.* Bones of the head.

*Phonic.* The doctrine of sounds.

*Phrenic.* Diaphragm, or midriff.

*Pistillum.* Female organs of generation in plants.

*Pituitary membrane.* Of the nose.

*Prophylactic.* Preventive of disease.

*Pyromucous.* A peculiar acid.

## R.

*Ratafia.* Nearly similar to syrups.

*Ruminating.* Animals that chew the cud.

## S.

*Stomachics.* Medicines which are serviceable to the stomach.



*Sapid.* A strong taste.

*Sedative.* Reducing the animal action.

*Sanguiferous.* Relative to the blood.

*Schniederian membrane.* Of the nose.

*Silicia, or silex.* Flint stone.

*Somnambula.* A person who walks in his sleep.

*Somnolency.* A propensity to sleep.

*Spermatocele.* Tumor of parts of generation, produced by a stagnation of semen.

*Stamina.* Fine threads which grow within the flowers of plants.

*Sternutatory.* Articles that excite sneezing.

*Style.* That part of the pistillum, which elevates the stigma from the germen.

*Synapisms.* Exciting plasters or poultices.

*Sudorific.* Medicine that promotes sweat.

*Superfetation.* When there are two impregnations at different periods before a delivery.

## T.

*Testaceous.* Fish with an entire thick shell.

*Tetradynamia.* Plants that bear hermaphrodite flowers.

*Tuberous.* Knobby roots.

*Transpiration.* Perspiration.

## U.

*Ustilaginous.* Calcining or burning.

*Univalve.* One shell.

*Urethra.* A pipe that conveys the water from the bladder.

## V.

*Vitrification.* Glass like, or conversion into glass.

*Vascular.* A vessel.

*Vesicatory.* Blister.

*Vasdeferentia.* Vessels belonging to parts of generation.

*Vessiculæ seminales.* Vessels which hold the semen.

END OF VOLUME II.

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